

FIGURE 30-22 Communications

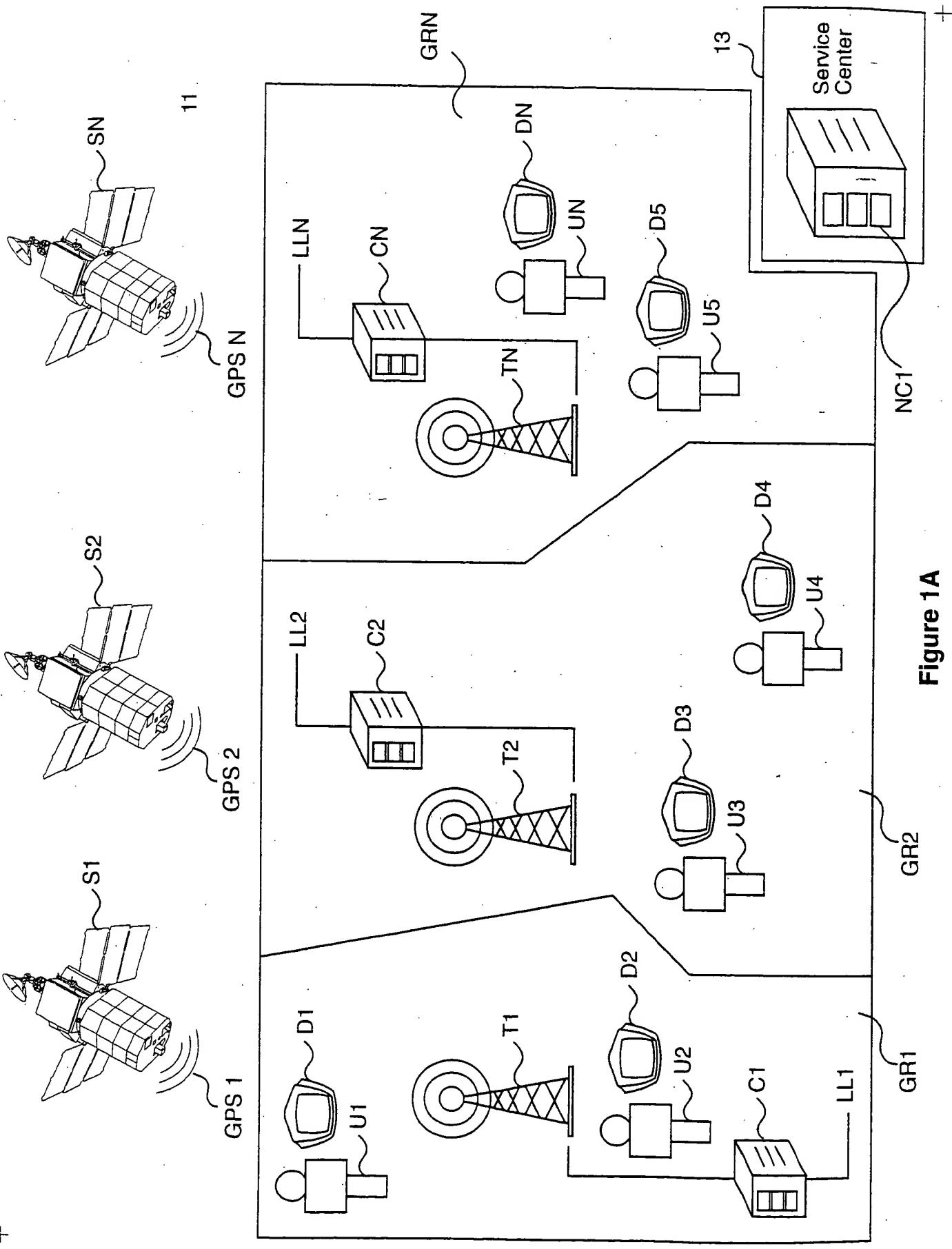
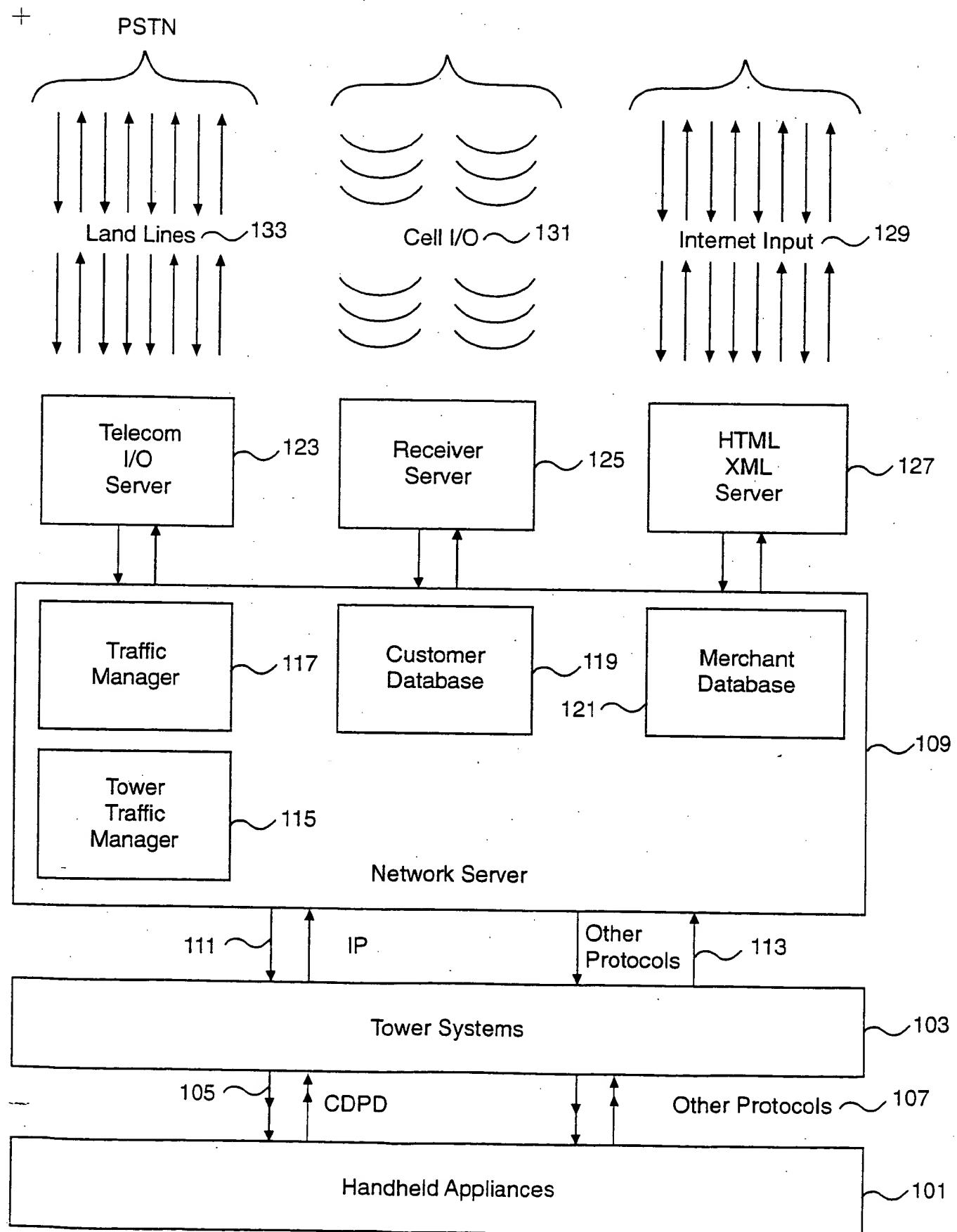


Figure 1A



**Figure 1B**

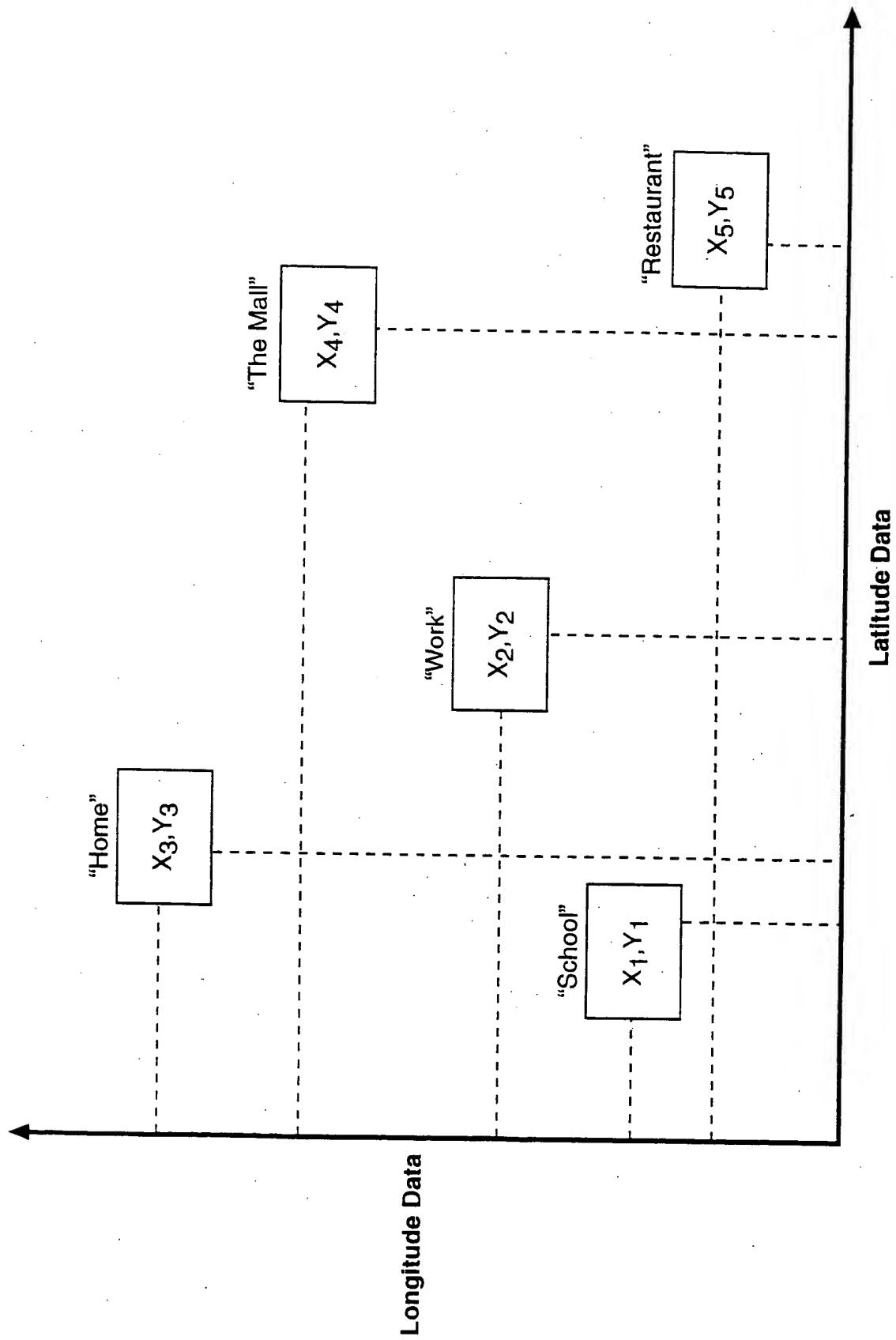


Figure 1C

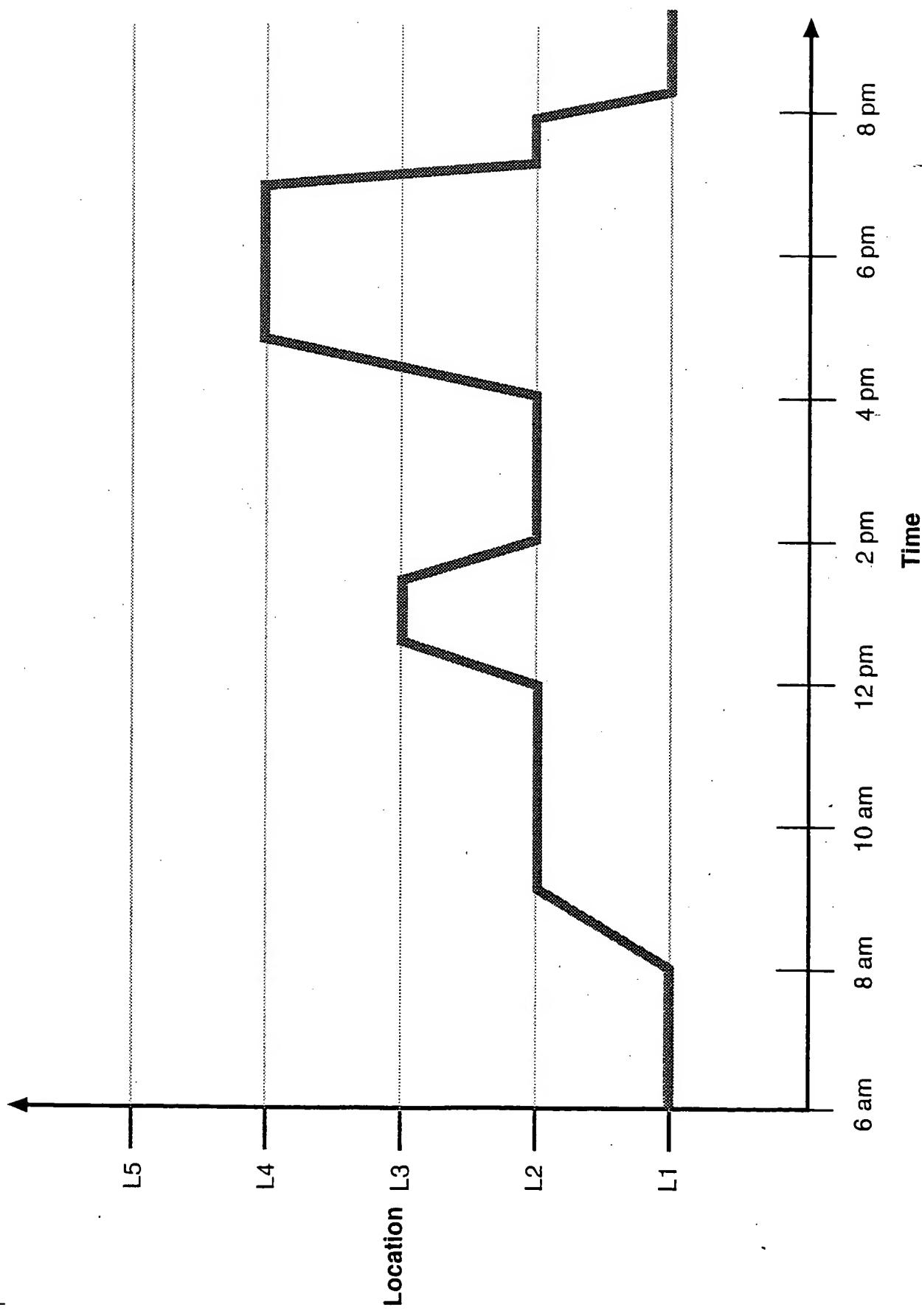


Figure 1D

161

159

157

Biographic Data		Data	Confidence	Correlation
151	Name	Sue	High	Yes
163	Gender	Female	High	Yes
165	Age	13	Medium	Yes
167	Ethnic Background	Chinese-American	Medium	No
169	Demographic Data			
153	Culture	American	Low	No
171	Region	East Coast	High	Yes
173	Likely Family Income	High	Low	No
175	Preferences Data			
155	Action Movies	High Interest	High	No
177	Hip-Hop Music	Low Interest	Low	No
179	Clothing from The GAP	High Interest	High	Yes
181				

Figure 1E

213

201

221

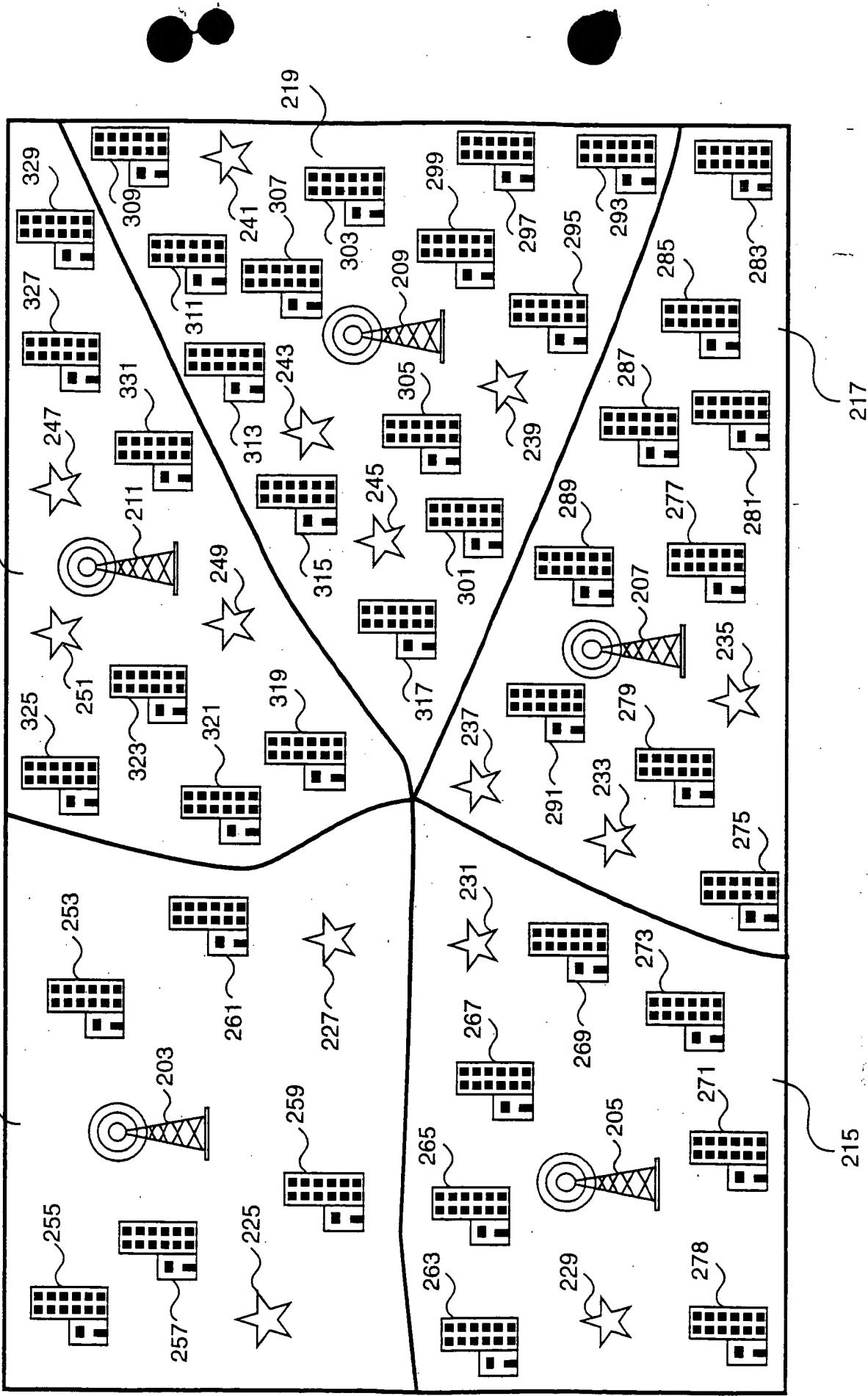


Figure 1F

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
203	213	221	225 Riding Stables	253 Game Arcade
		215	227 Water Park	255 Video Store
				257 Taco Stand
				259 Book Store
				261 Riding Supply Store

Figure 1G (1 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
205	215	213	229 Aunt Jane's House	263 24-Hour Gym
		217	231 Linear Park	265 Ice Skating Rink
		221	233 Pottery Supply Store	267 Sporting Goods Superstore
				269 Promdress Shop
				271 Belgian Chocolate Store
				273 Pet Store
				278 Model Train Store

Figure 1G (2 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
207	217	219	235 Candy's House	275 Corn Maze
		221	237 Resale Boutique	277 Aquarium
		215		279 Museum
				281 I-MAX Theatre
				283 Movie Theatre
				285 Laser Tag Facility
				287 Pizza Place
				289 Zoo
				291 Public Library

Figure 1G (3 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
209	219	217	239 Home	293 Mall #1
		221	241 School	295 Mall #2
			243 Work	297 Chinese Food
			245 Suzy's House	299 K-Mart
				301 Target
				303 Record Store
				305 Batting Cages
				307 Golf Driving Range
				309 Computer Superstore
				311 Boy's Club
				313 Church #1
				315 Restaurant #14
				317 Bicycle Shop

Figure 1G (4 of 5)

Tower No.	Region	Adjoining Regions	Favorite Places	Network Affiliates
211	221	219	247 Uncle Clay's House	319 Metro Stop
		217	249 The Gap	321 Starbucks
		215	251 Grand Mother's House	323 Bowling Alley
		213		325 Antique Mall
				327 Tennis Facility
				329 Car Stereo Superstore

Figure 1G (5 of 5)

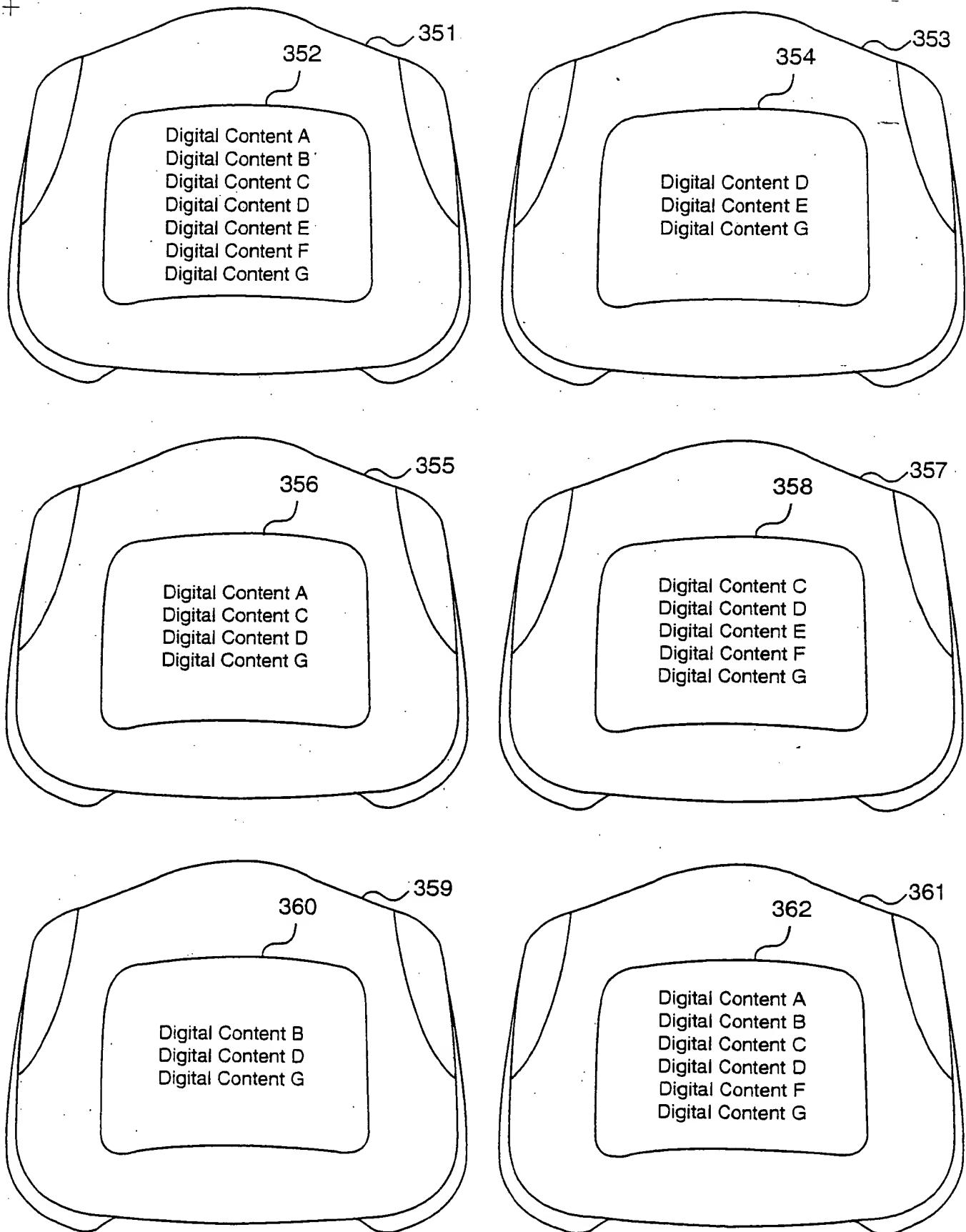


Figure 1H

Digital Content ID	Playable Digital Content	Source	Type	Subject	Energy Required to Play (Units)	Energy Earned for Playing (Units)	Preferred Location	Preferred Time	Period
385	Digital Content A	Movie	Merchant #12	Advertisement	X, Y	0	5	LATLONG1	After School
387	Digital Content B	Text and Alarm	Government Entity	Warning	Weather	0	0	Various Changing	Immediate
389	Digital Content C	Graphical Icon	Friend #1	Email Message		2	0	N/A	One Time Only
391	Digital Content D	Text Message	Acquaintance #3	Request for Chat		5	0	ASAP	7 Days
393	Digital Content E	Executable Spreadsheet	Merchant #2	Survey	L, M	0	20	LATLONG2	Between 12/1 and 12/25
395	Digital Content F	Text Message	School	Announcement	Sporting Event	1	0	N/A	25 Days
397	Digital Content G	Calendar File	Soccer Team	Schedule		3	0	N/A	Between 3:00 pm and 10:00 pm
									Incrementally Larger for 7 Days
									User Initiated for 2 Days

Figure 11

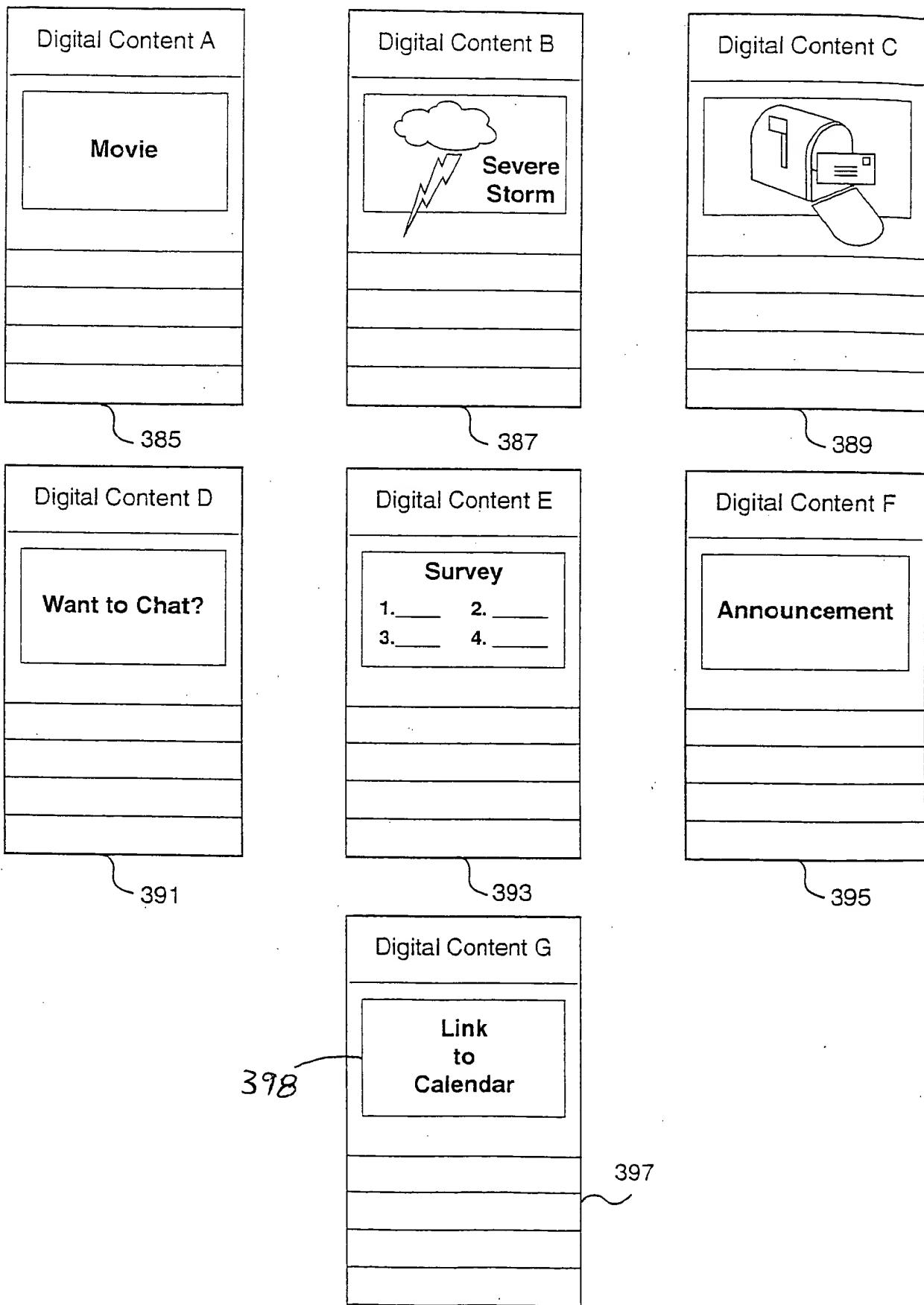
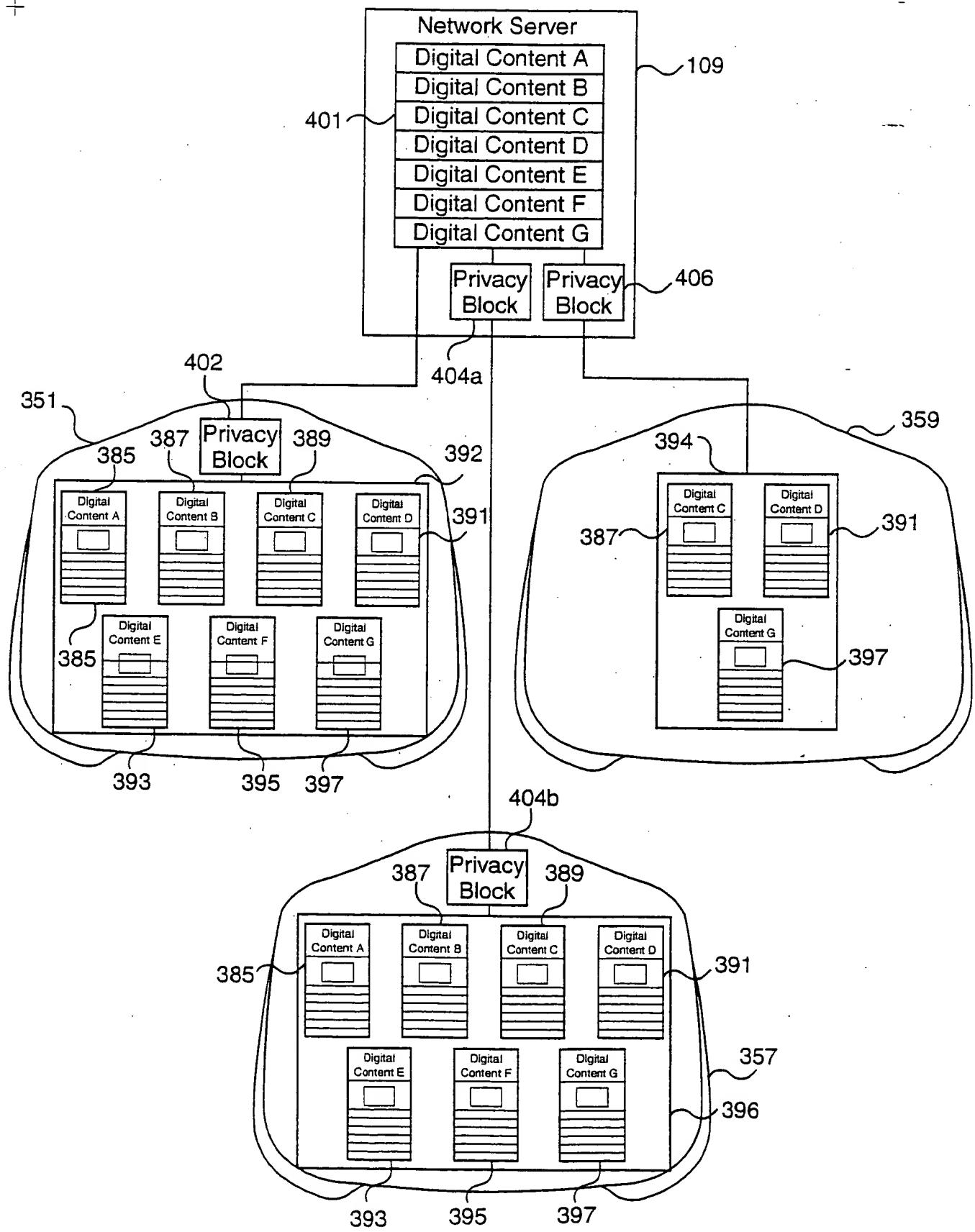


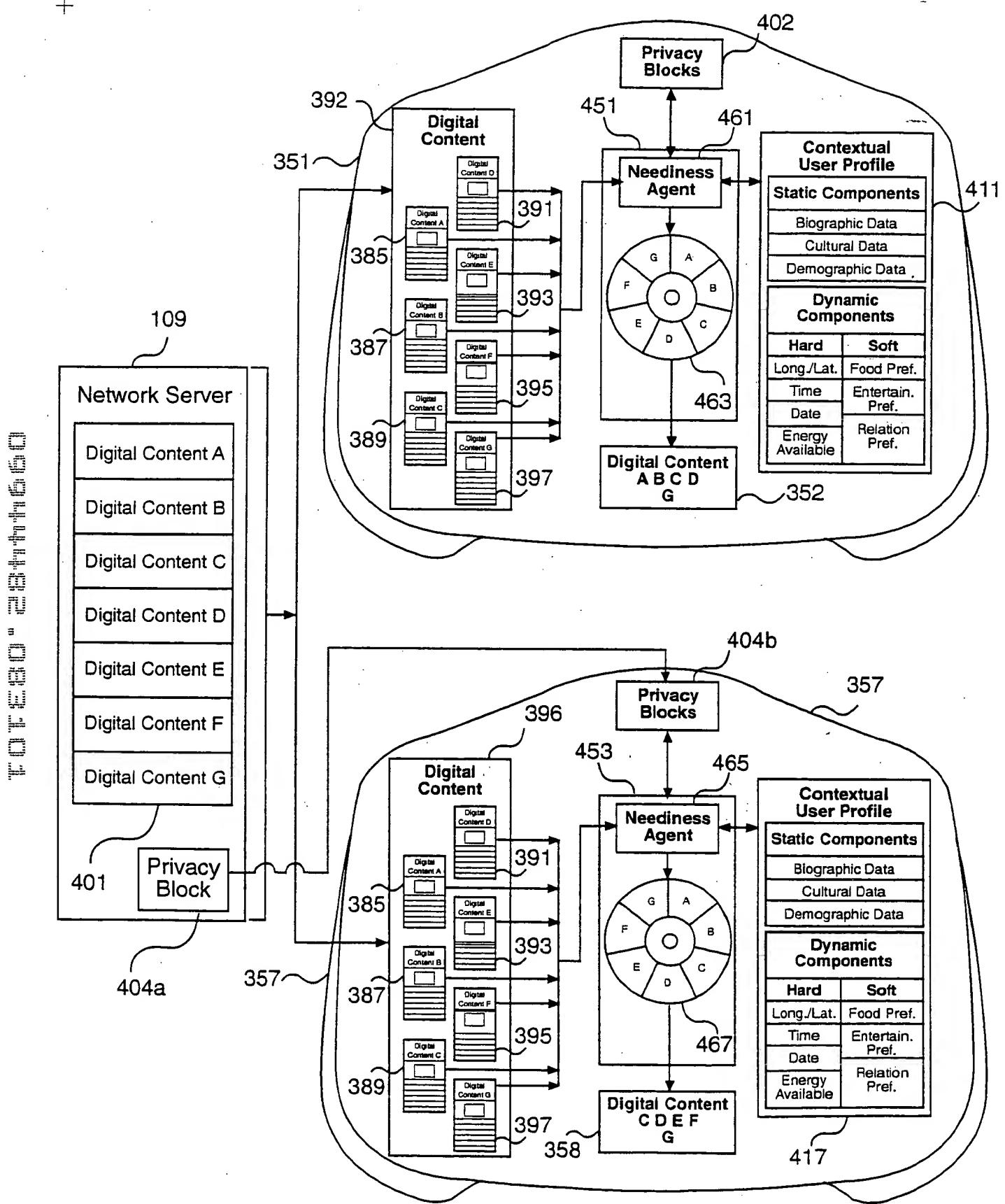
Figure 1J



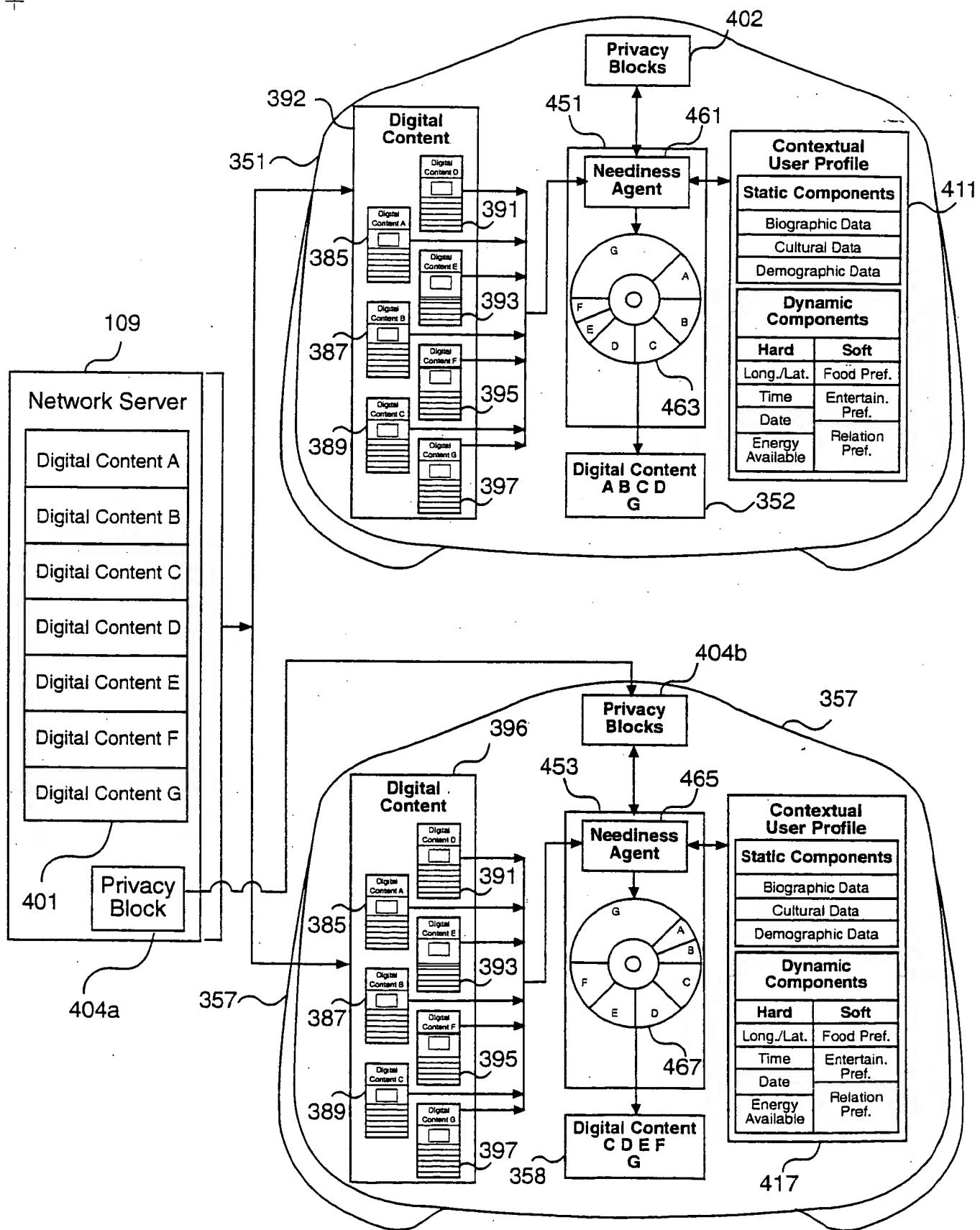
**Figure 1K**

Contextual User Profile										
Static Components					Dynamic Data Components					
User/Appliance	Biographic	Demographic	Cultural	Latitude Longitude	Time	Date	Available Energy	Food Pref.	Entertainment Preferences	Relationship Preferences
409	423	423b	423c	425a	425b	425c	425d	425e	425f	425g
411	B1	DM3	C1	LATLONG1	4:00 pm	12/5	130	F1	E1	R3
413	B3	DM2	C2	LATLONG2	4:30 pm	12/5	43	F2	E3	R2
415	B2	DM1	C3	LATLONG3	5:00 pm	12/5	62	F3	E2	P2
417	B1	DM2	C1	LATLONG4	4:00 pm	12/5	227	F3	E1	R1
419	B3	DM3	C2	LATLONG5	4:30 pm	12/5	39	F2	E3	P4
421	B1	DM3	C3	LATLONG6	5:00 pm	12/5	200	F1	E2	R3
423	427a					427b				
407	425					425h				

Figure 1L



**Figure 1M**



**Figure 1N**

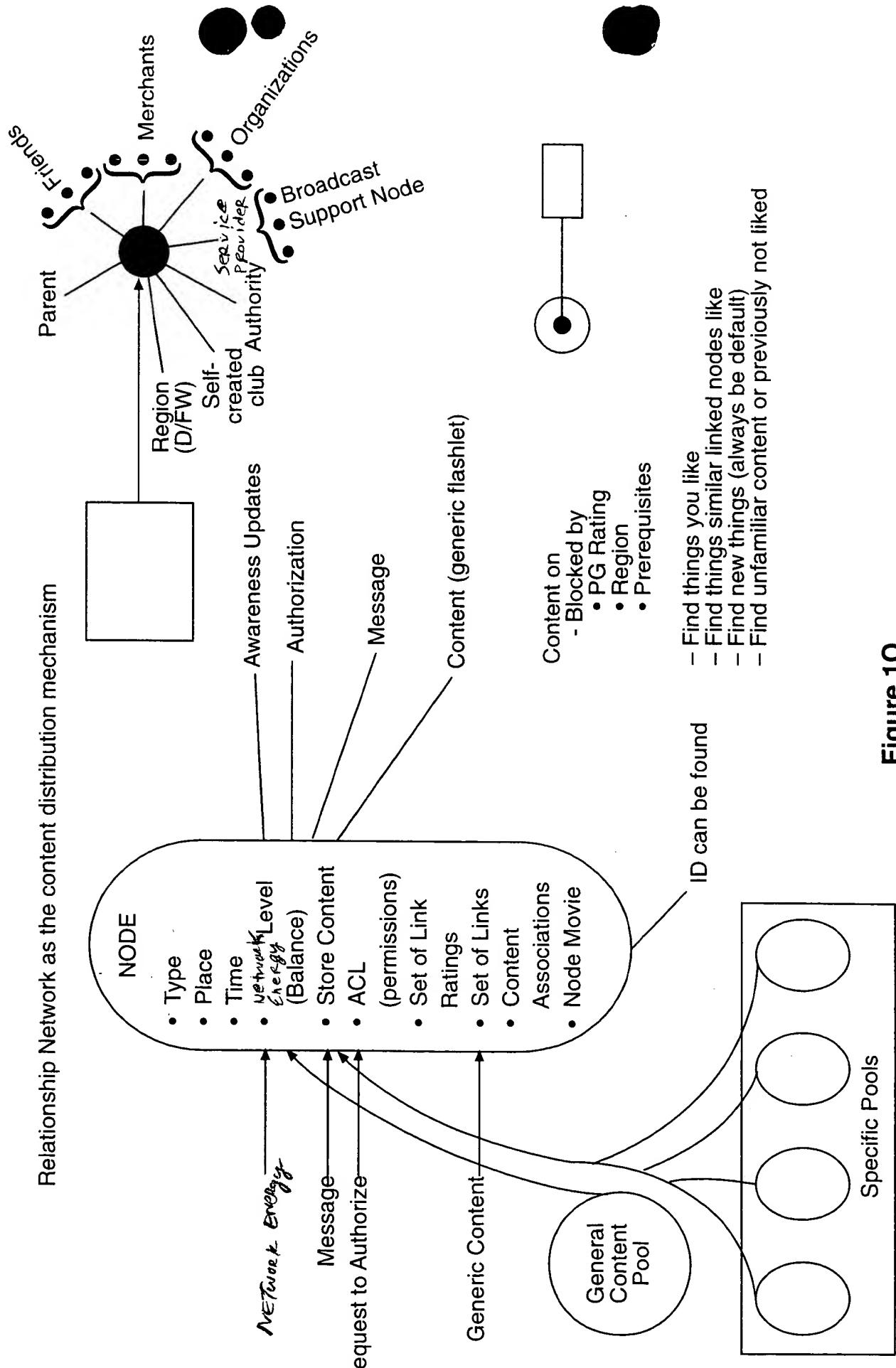
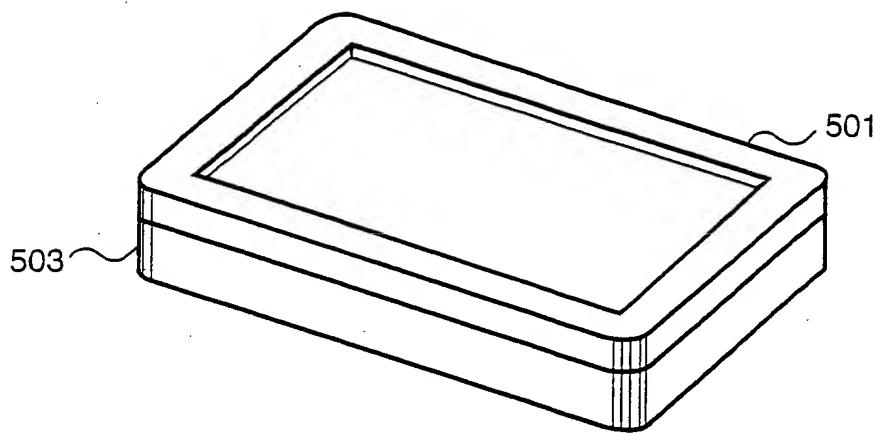
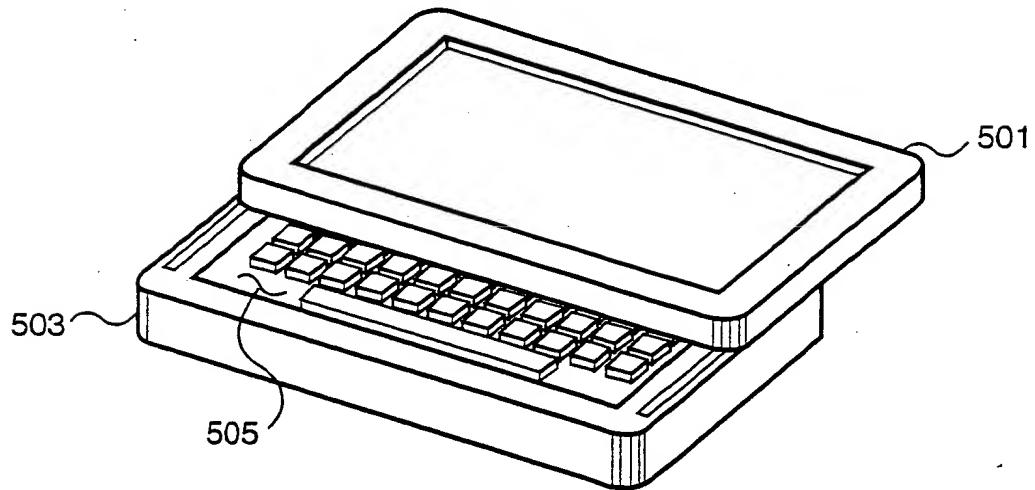


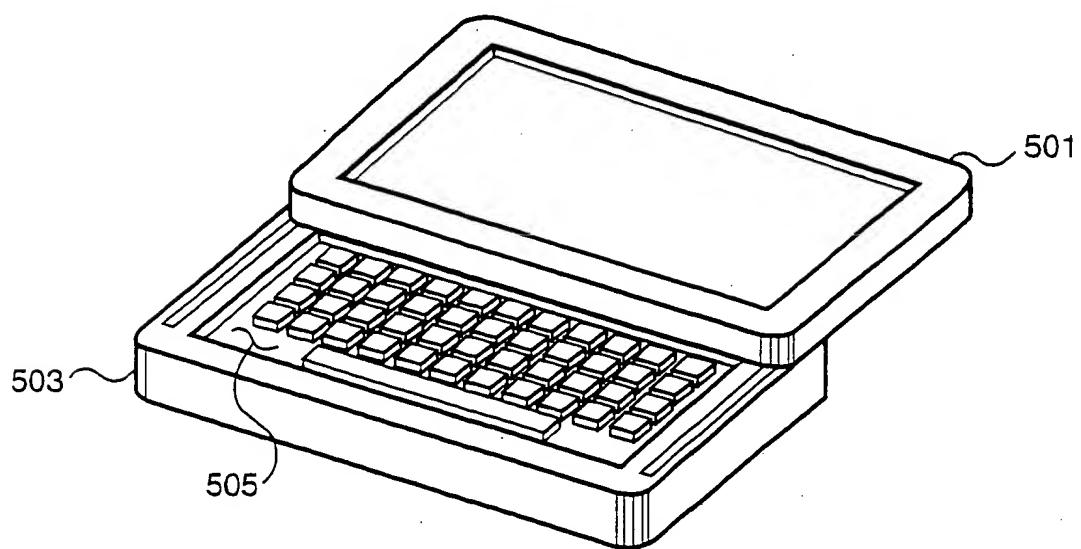
Figure 10



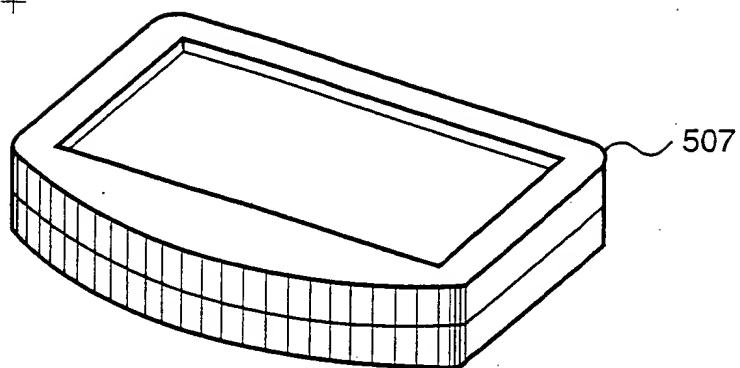
**Figure 2A**



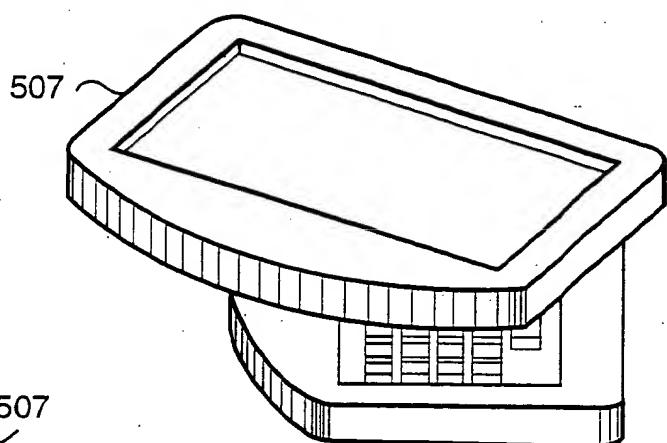
**Figure 2B**



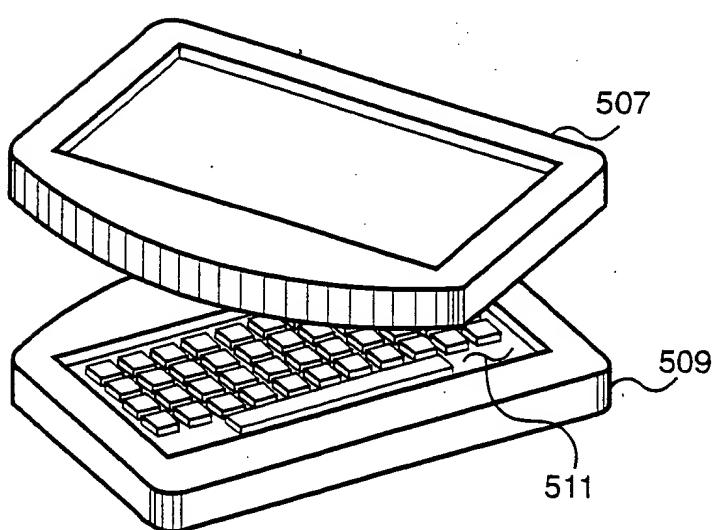
**Figure 2C**



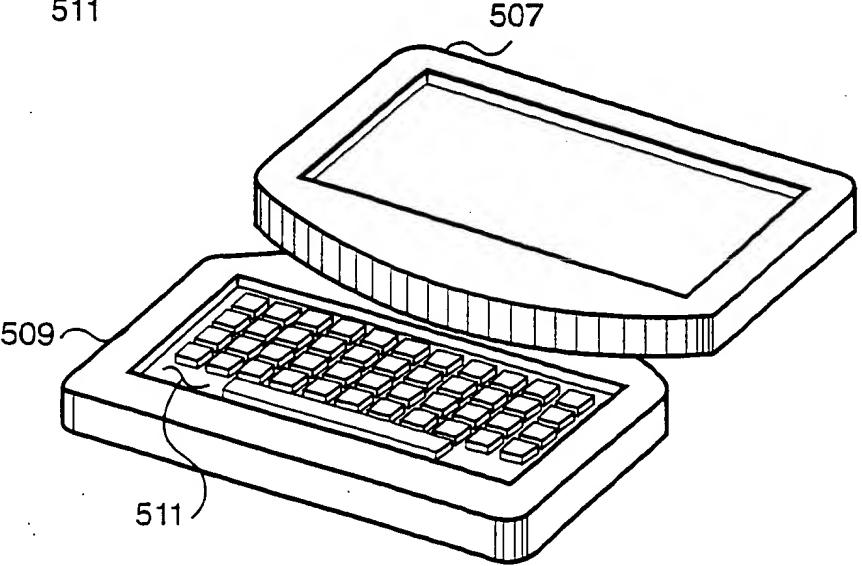
**Figure 2D**



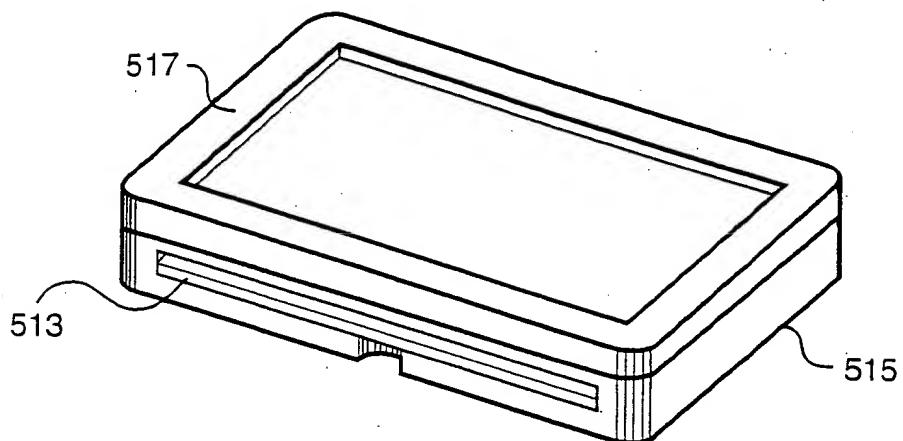
**Figure 2E**



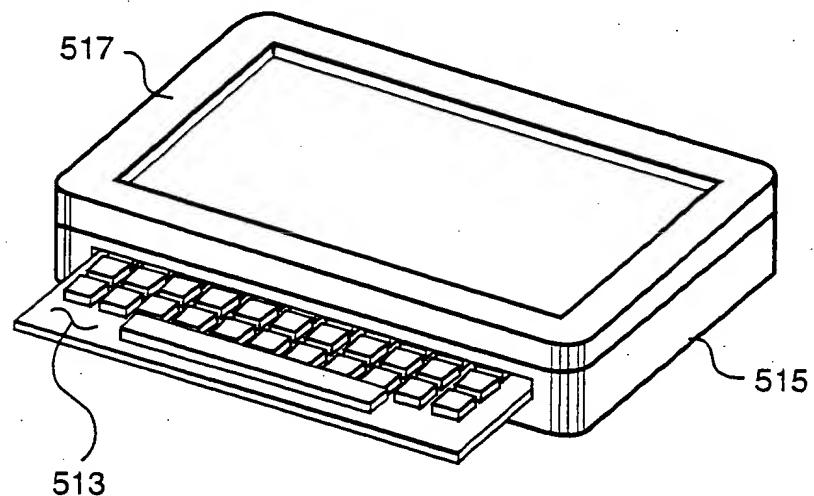
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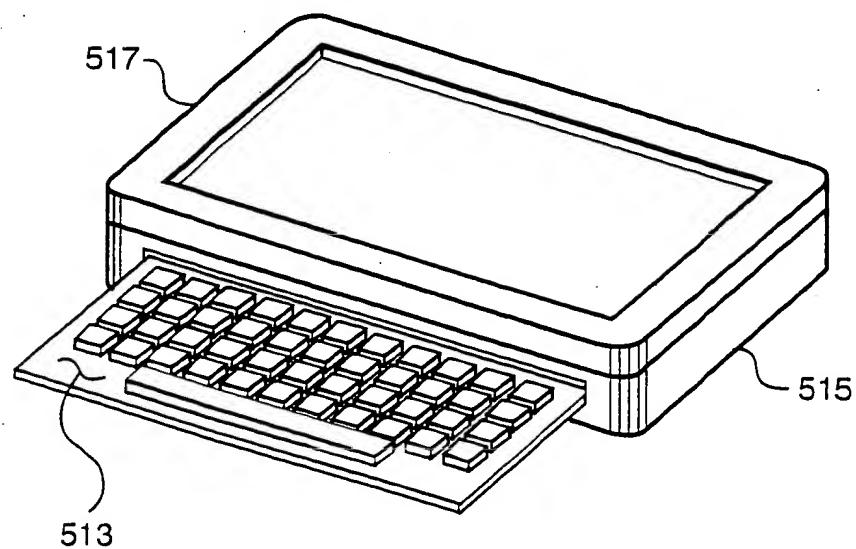
**Figure 2G**



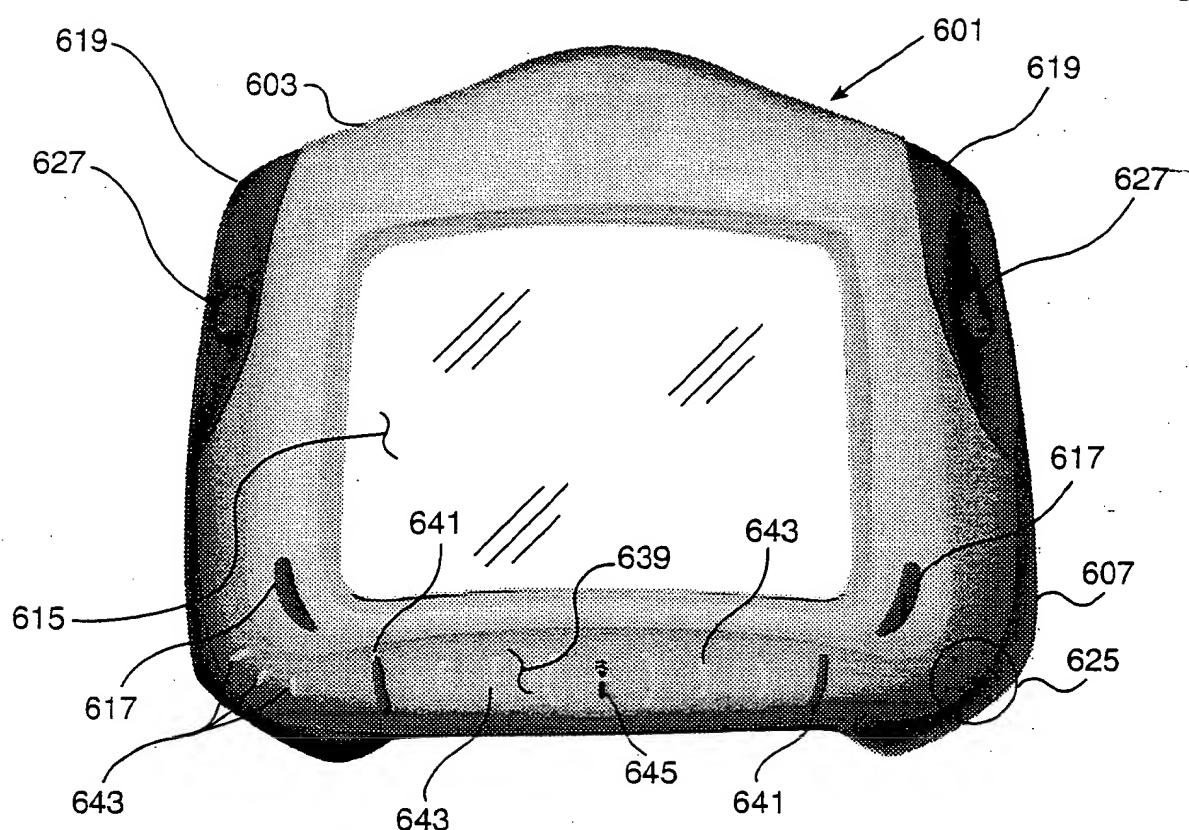
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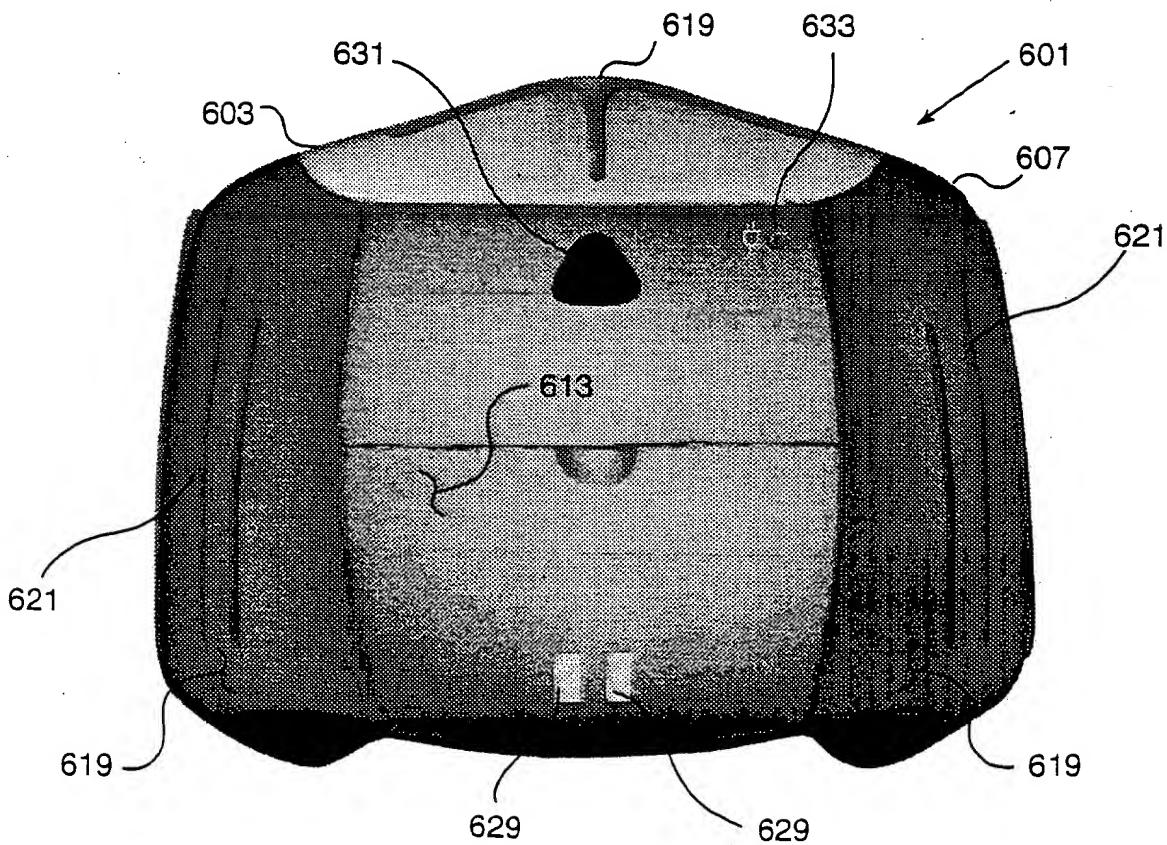
**Figure 2I**



**Figure 2J**



**Figure 2K**



**Figure 2L**

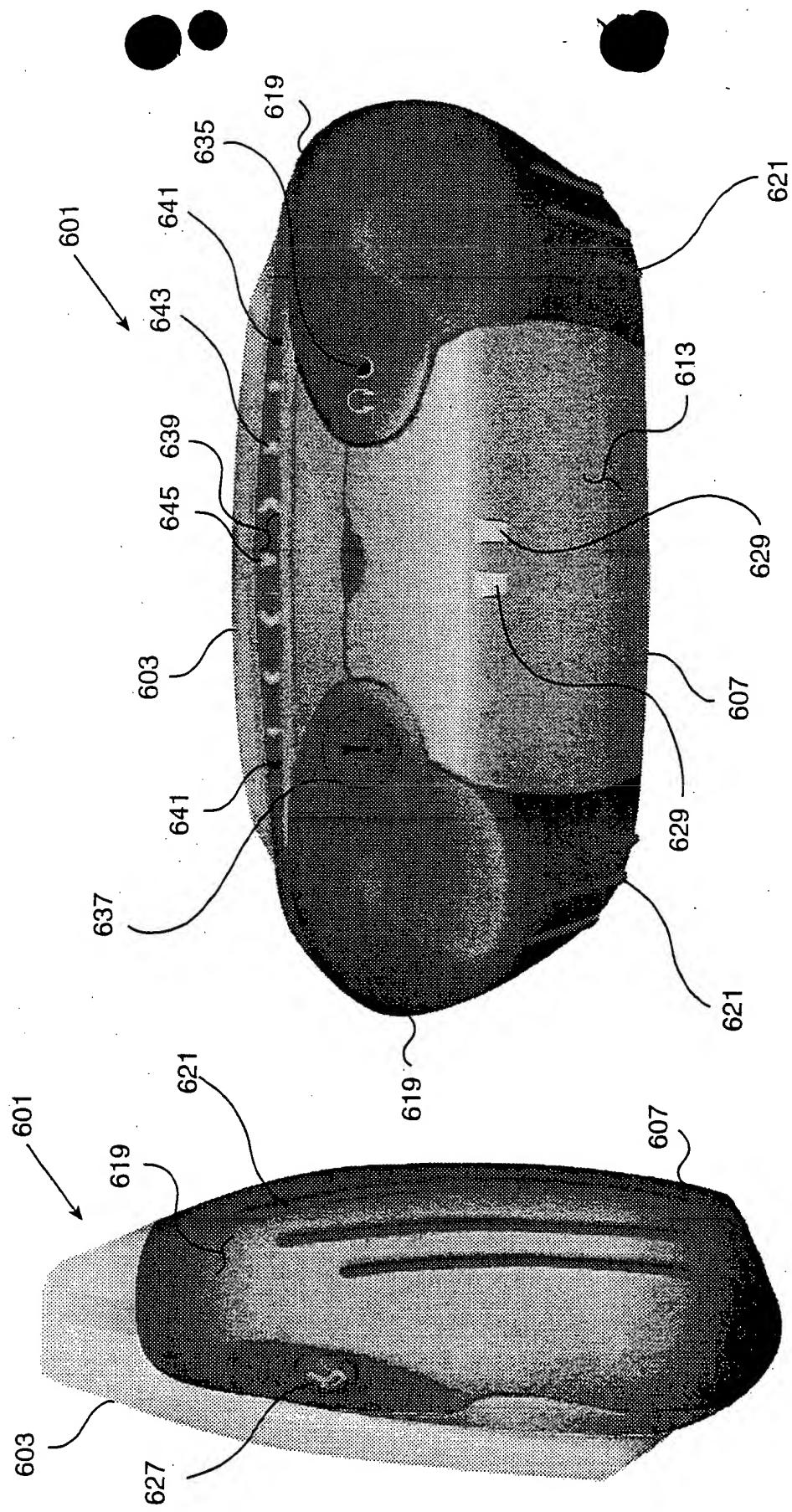


Figure 2M

Figure 2N

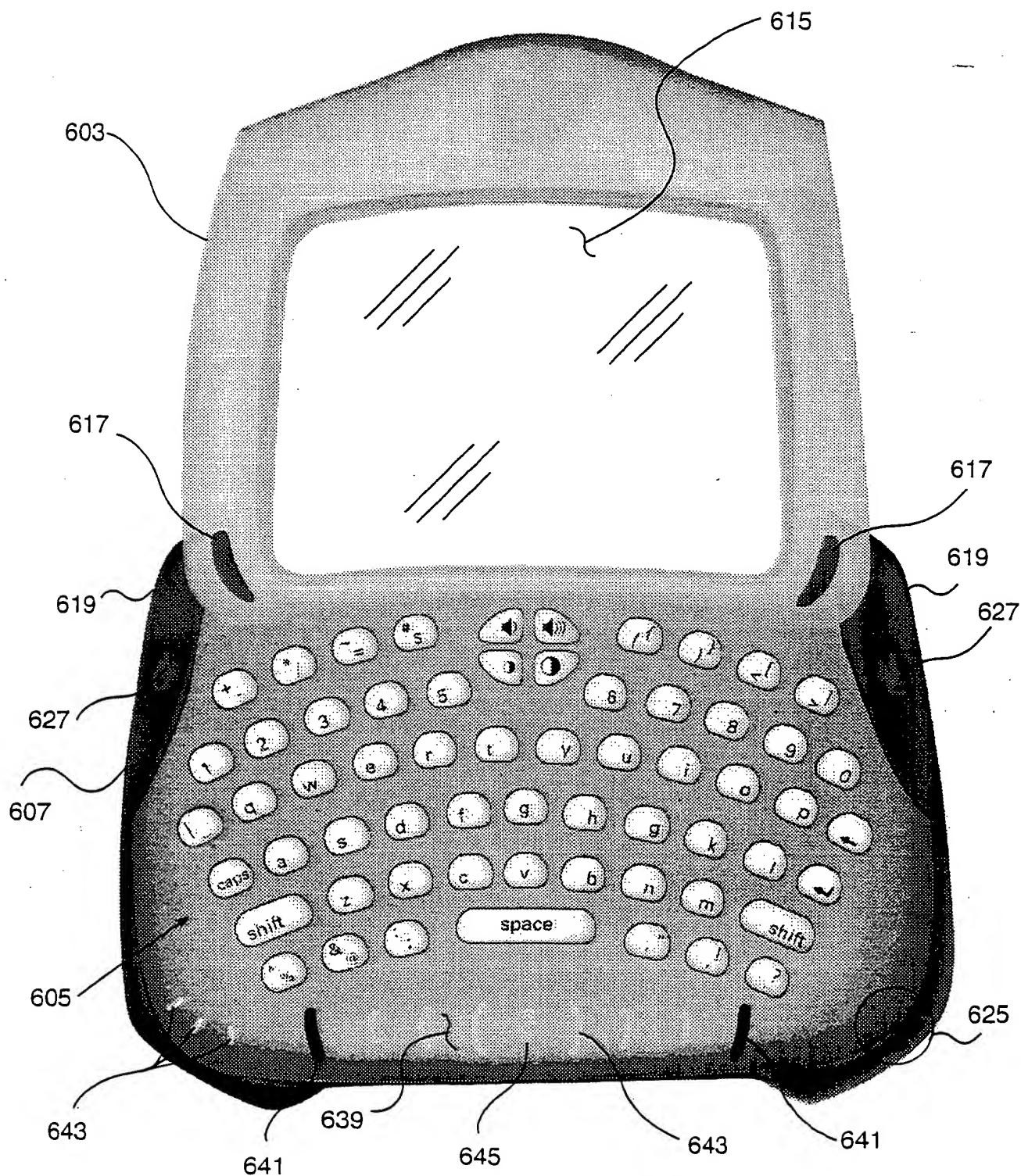


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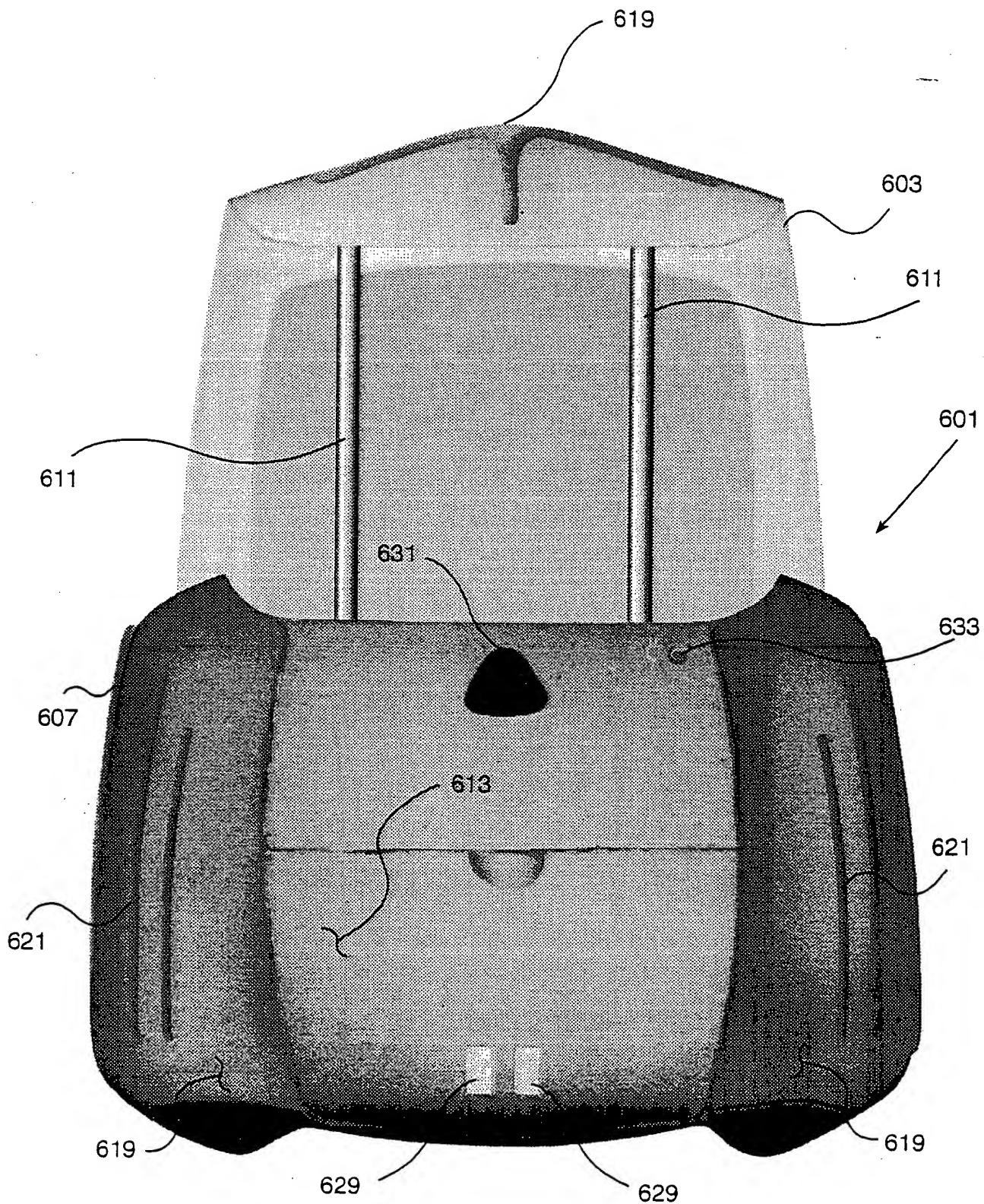


Figure 2P

Figure 2Q

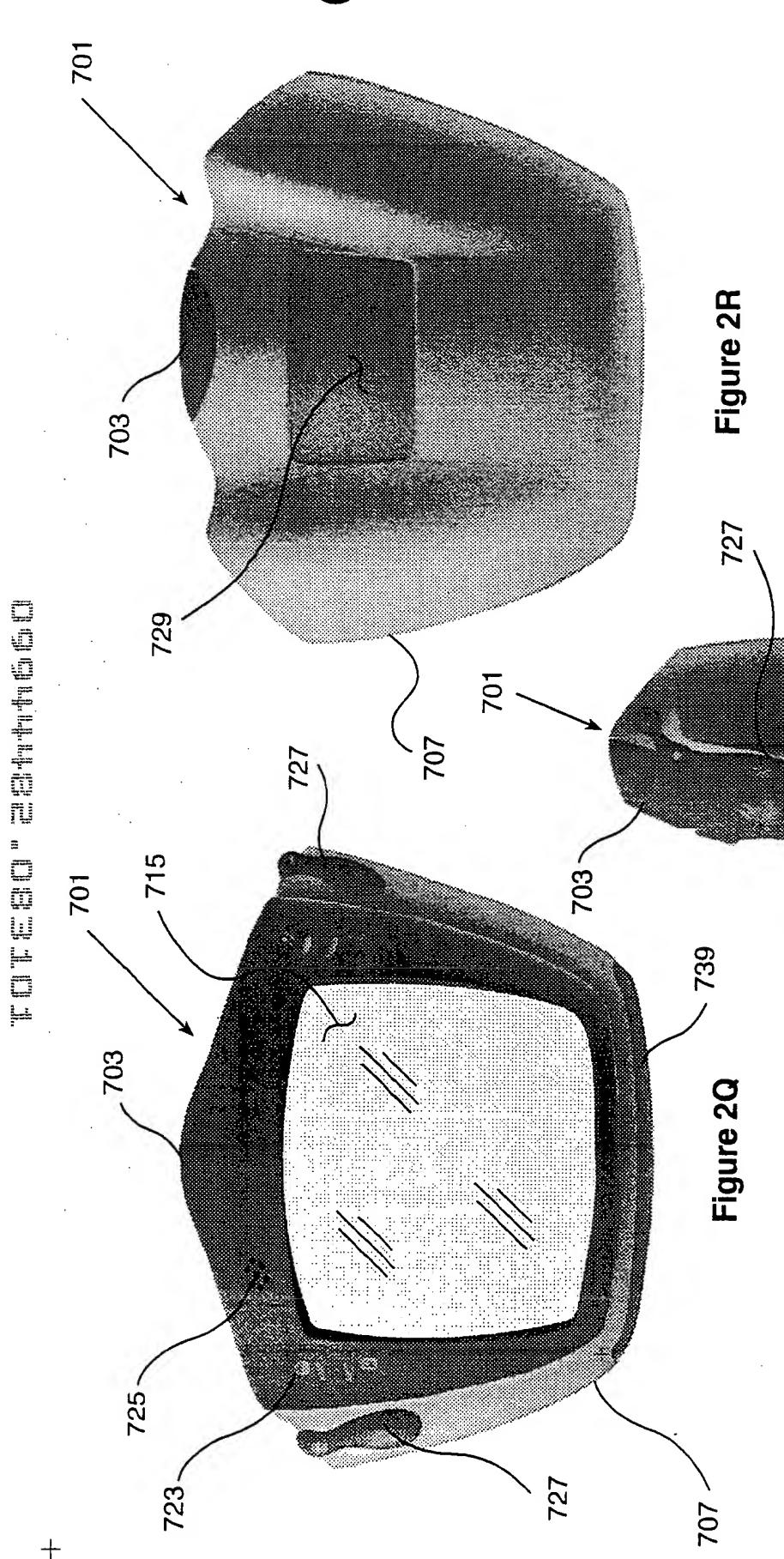


Figure 2R

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Figure 2Q

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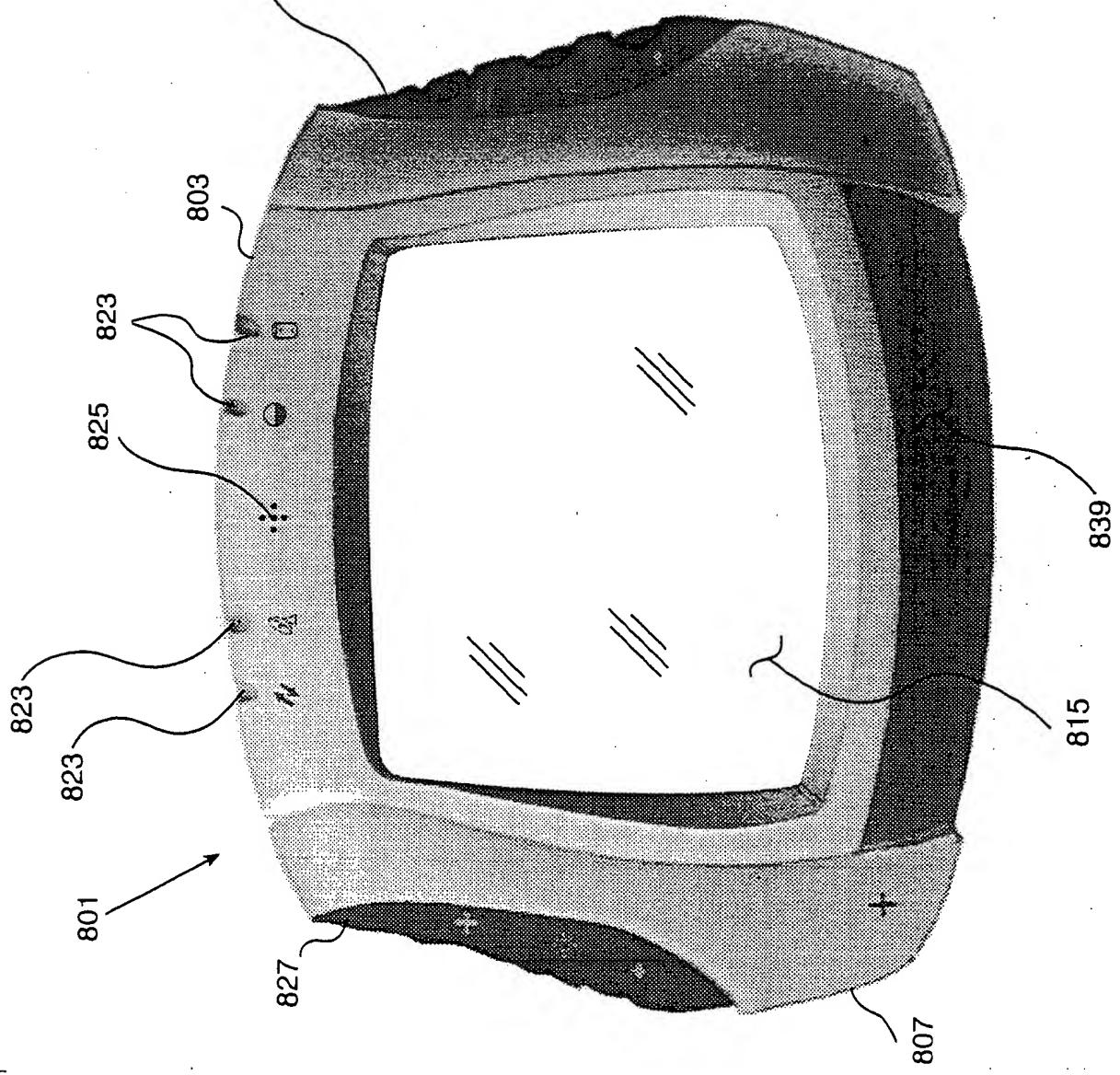
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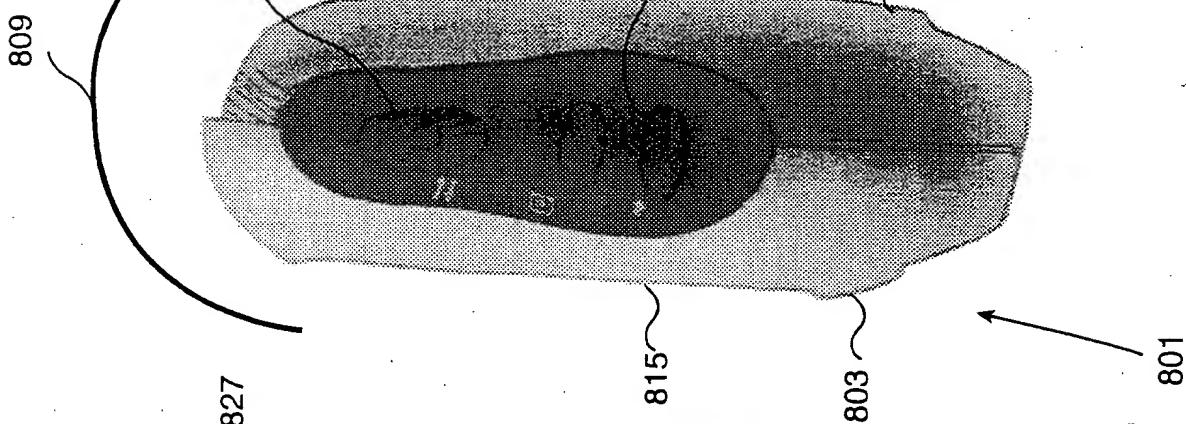
Figure 2S

739

10 0 0 0 0 0 0 0 0 0 0



**Figure 2T**



**Figure 2U**

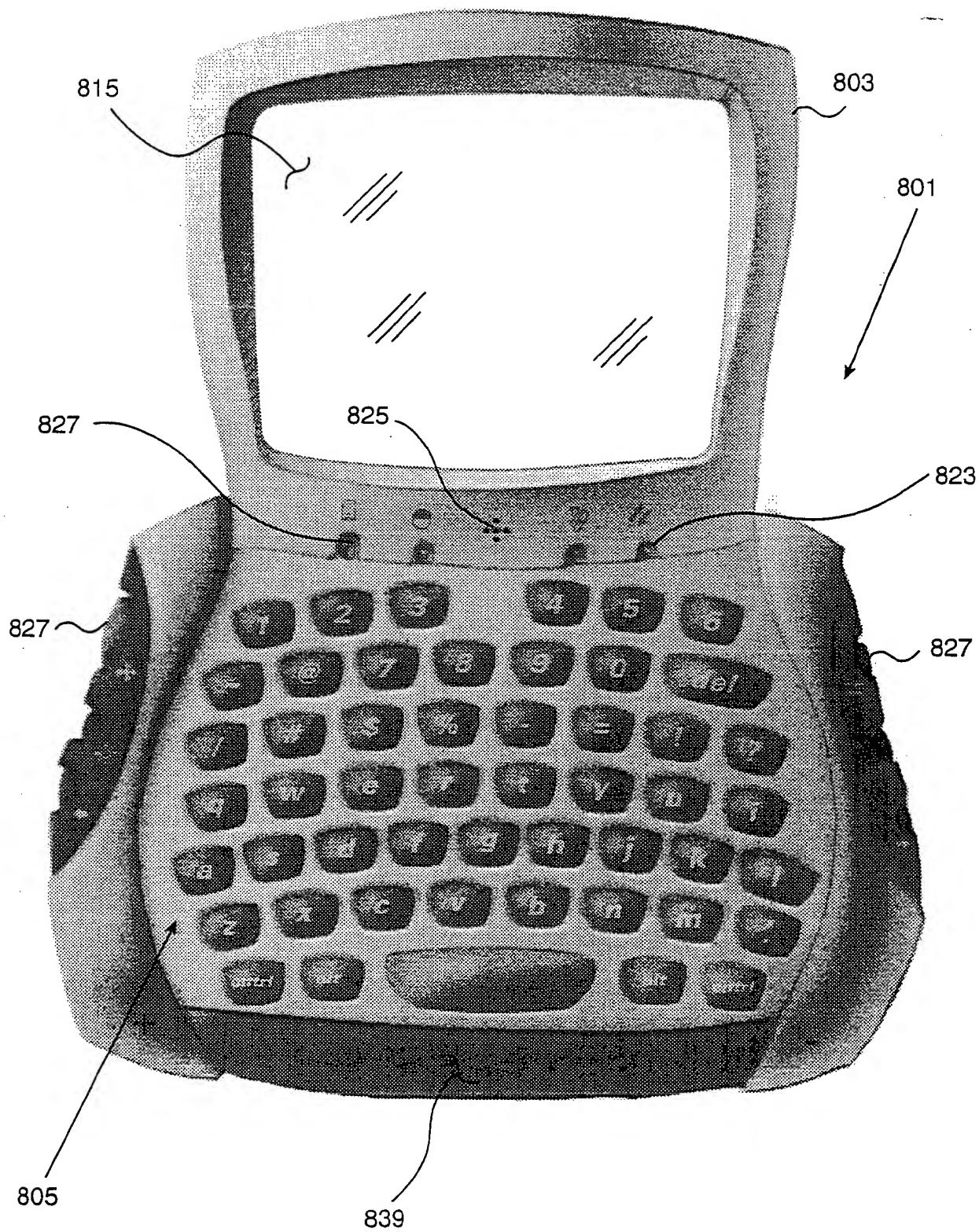
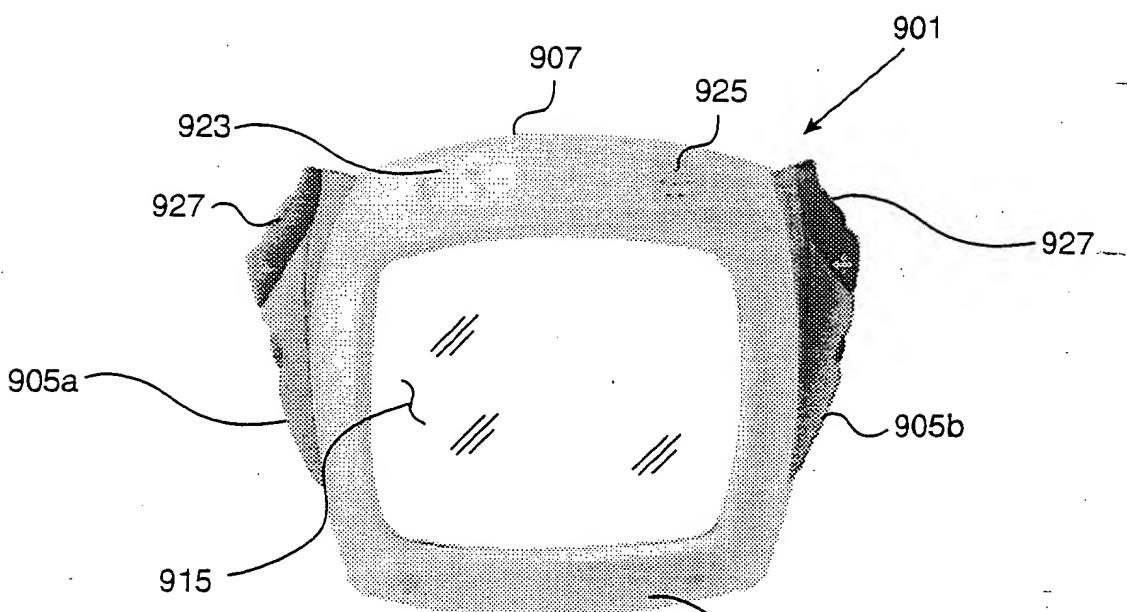
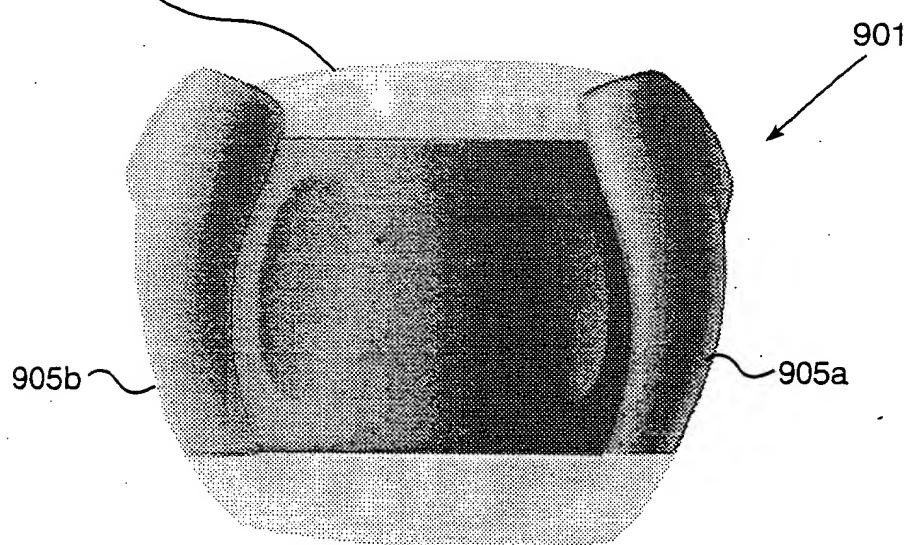


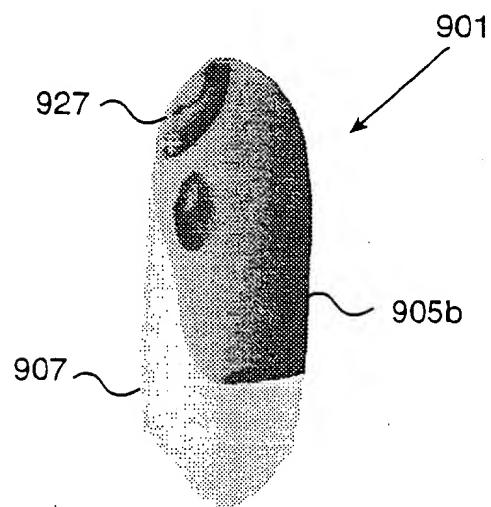
Figure 2V



**Figure 2W**



**Figure 2X**



**Figure 2Y**

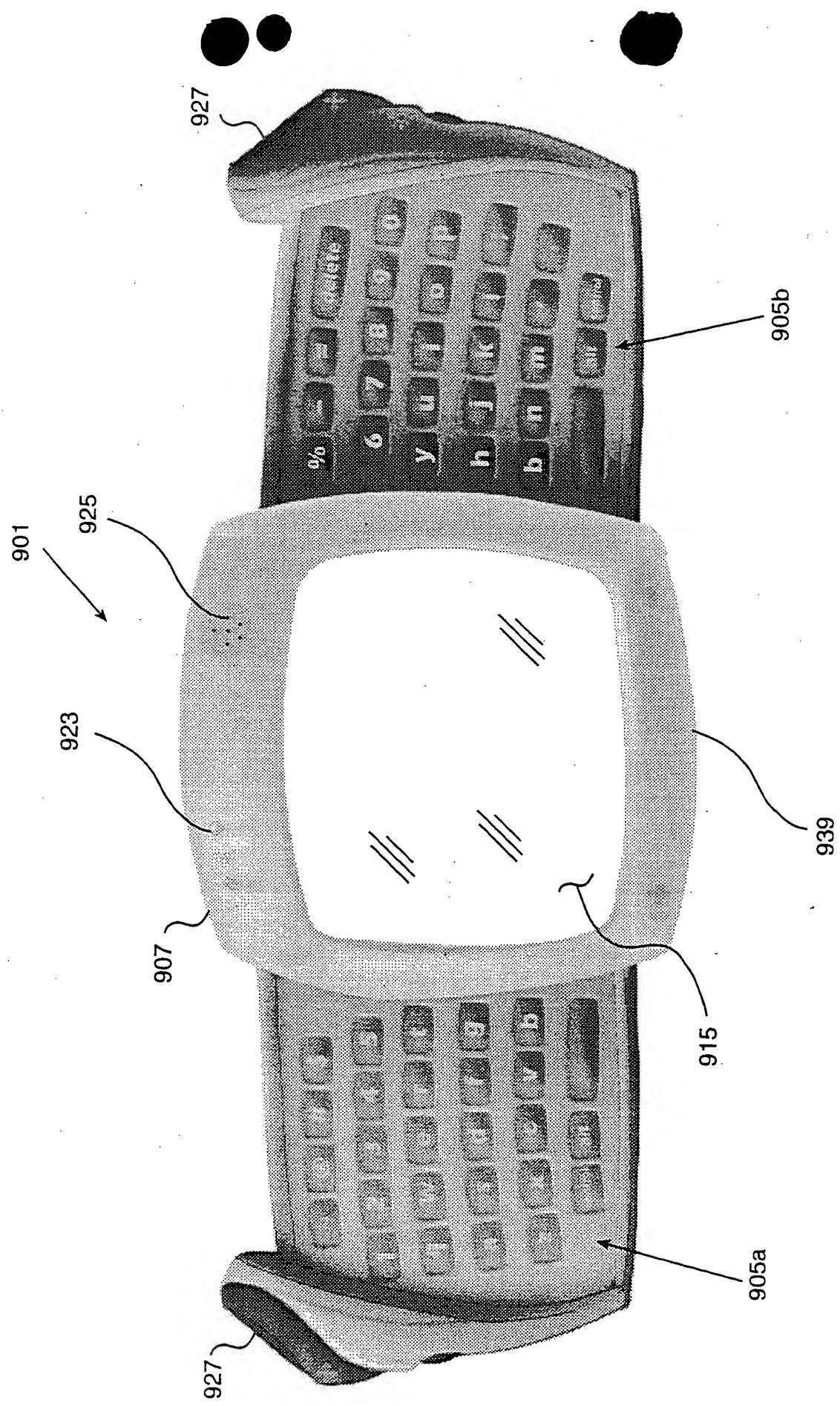


Figure 2Z

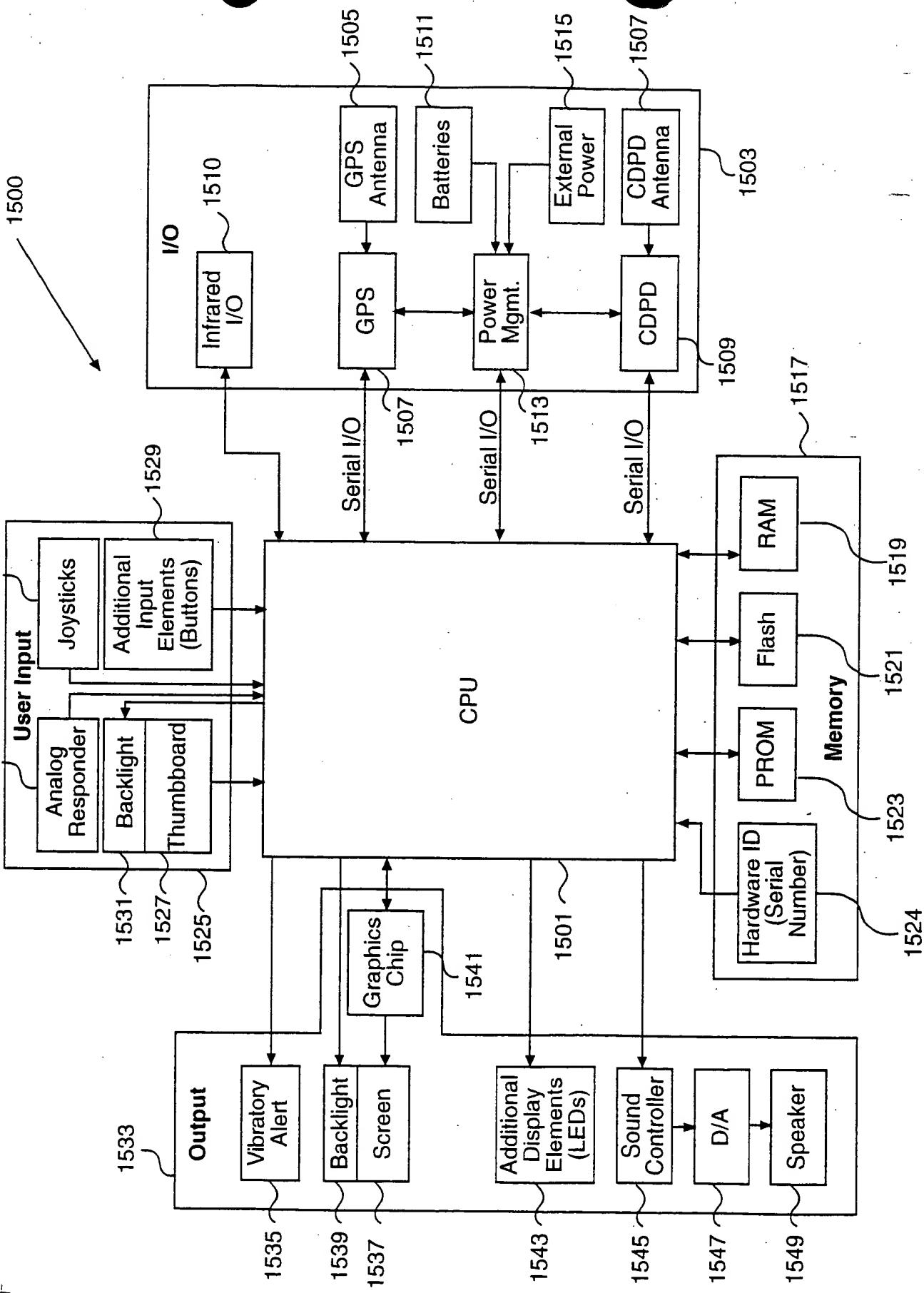


Figure 3A

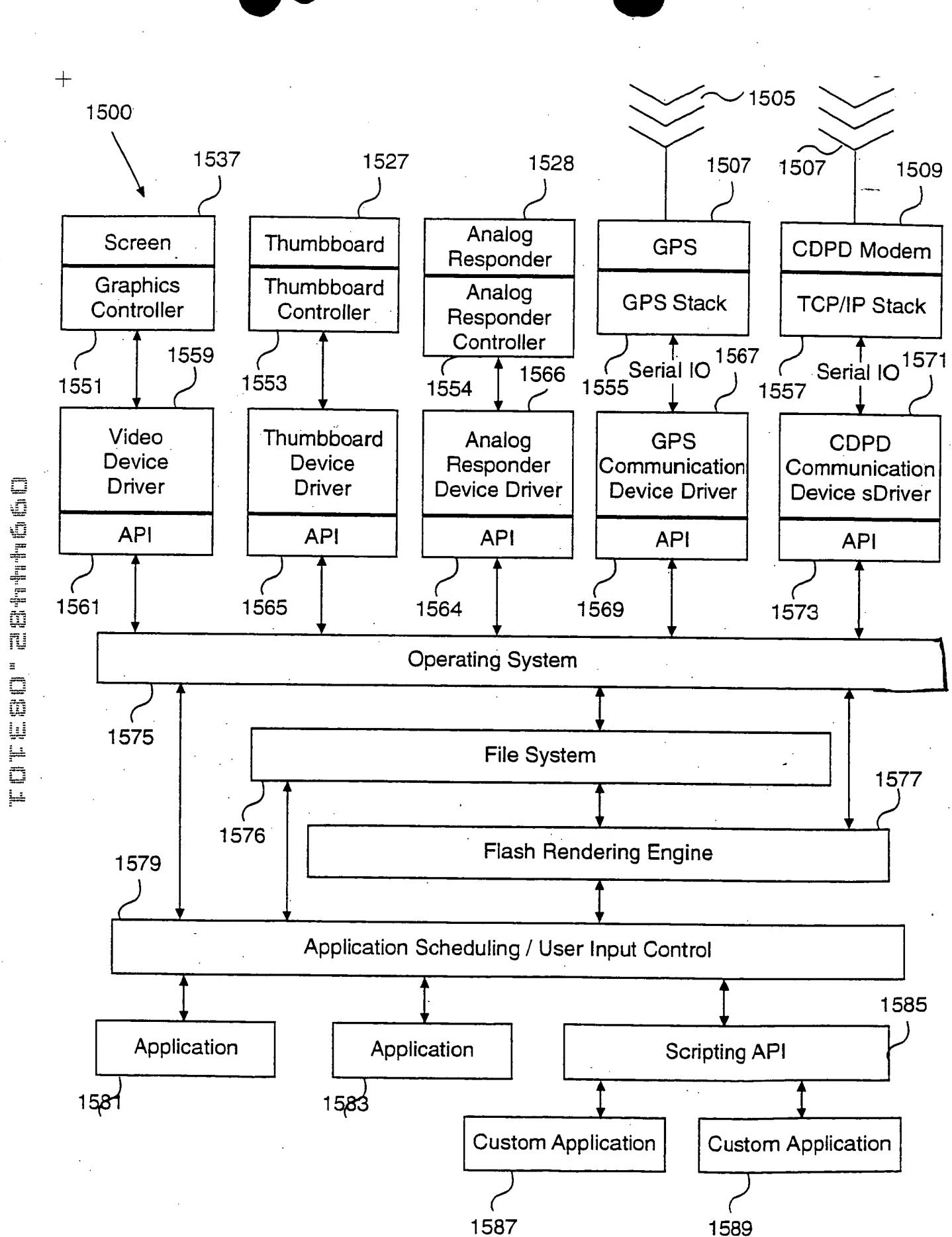


Figure 3B

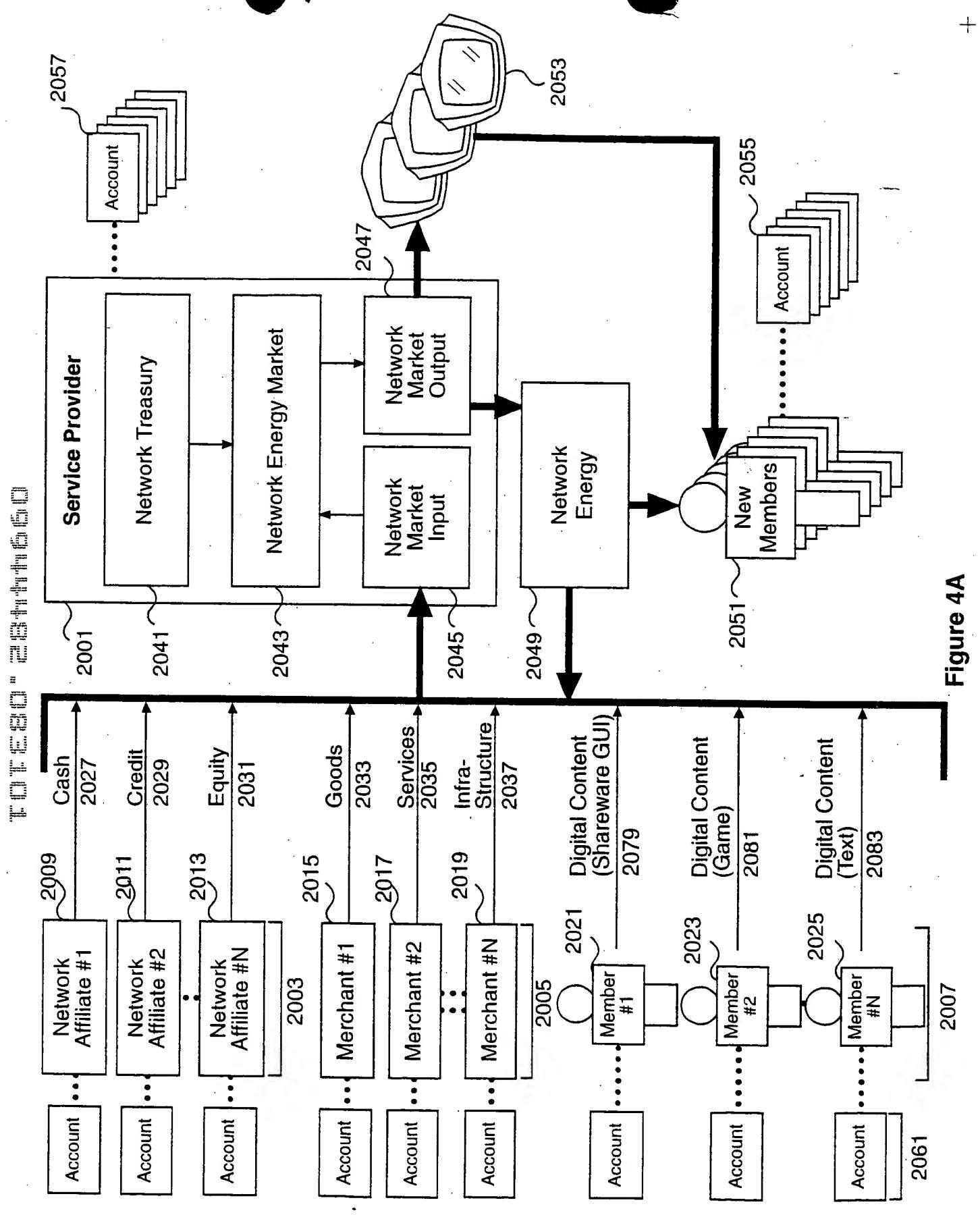


Figure 4A

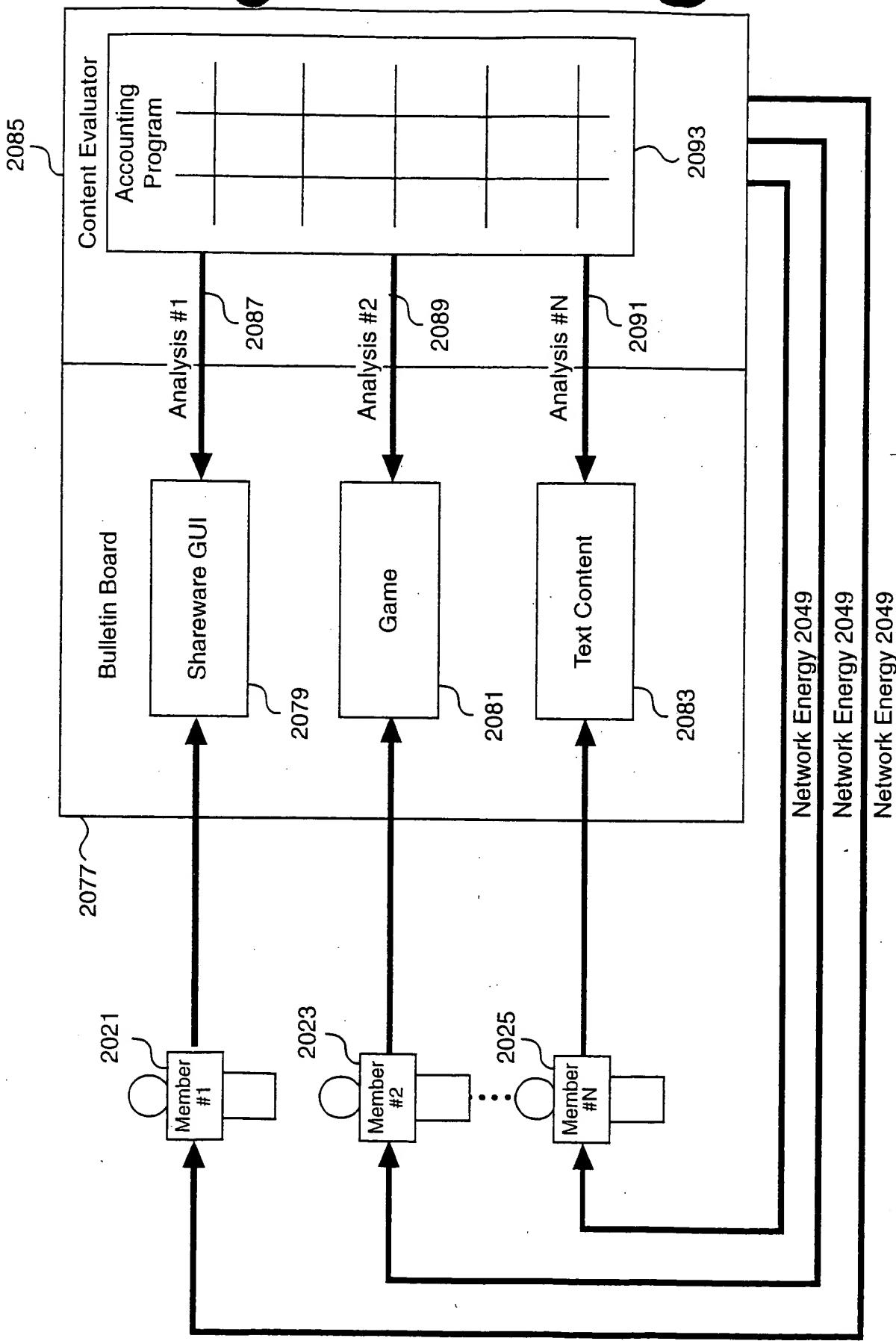


Figure 4B

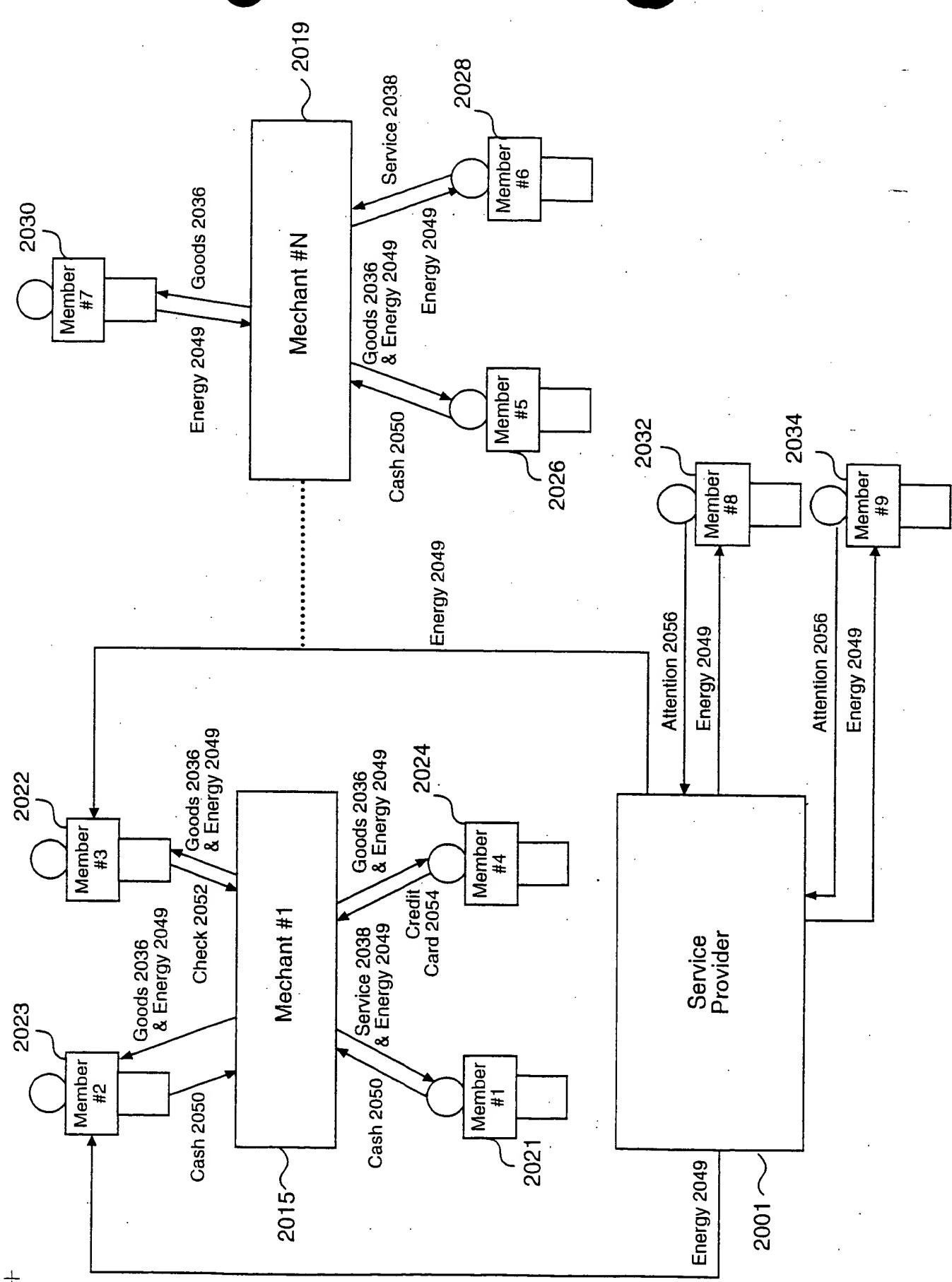
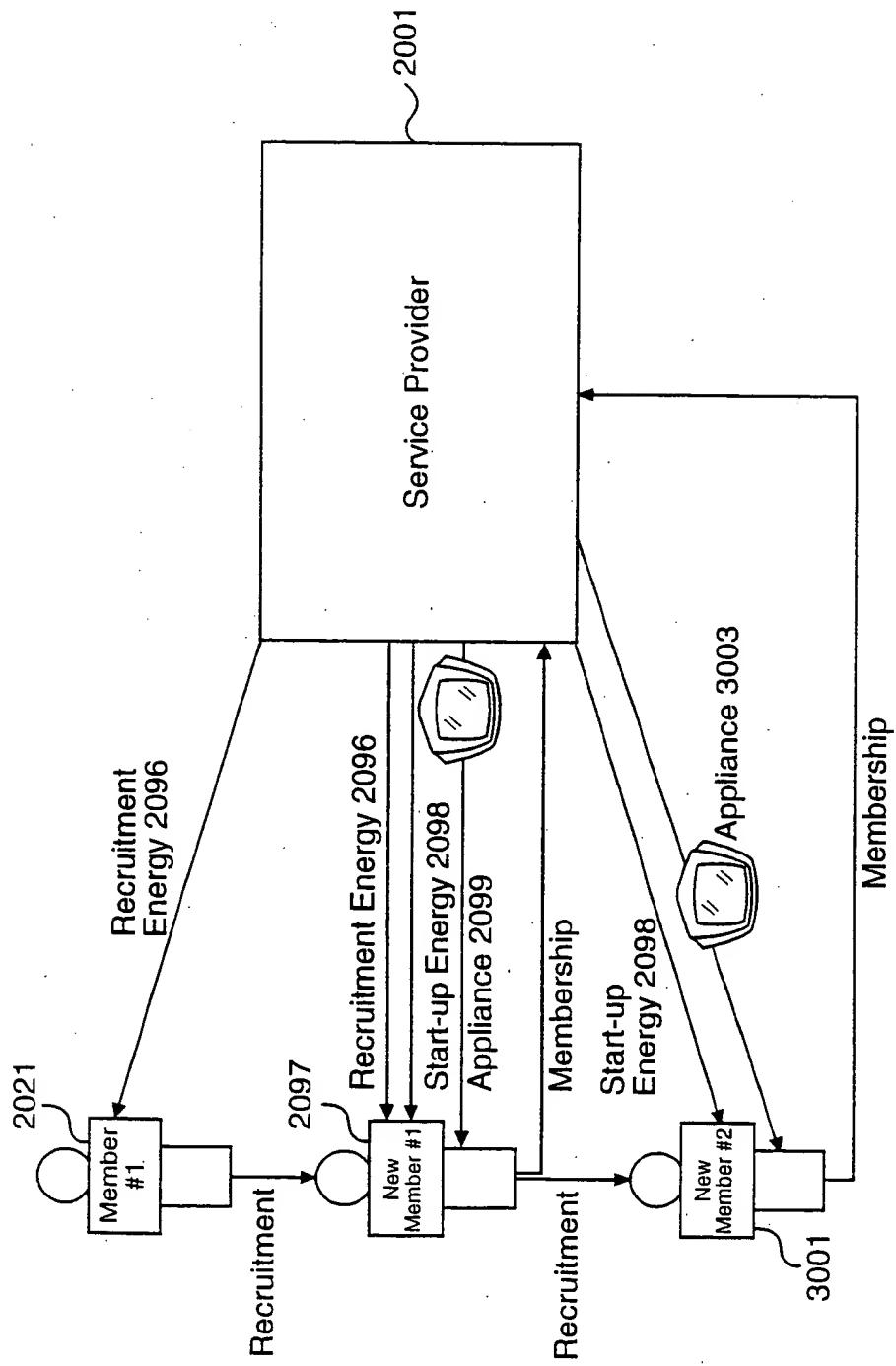


Figure 4C

Figure 4D



Type of Input Element	Non-Biasing	Starting Position	Needs On-Screen Indicator	Continuous					
				3001	3003	3005	3007	3009	3011
One-Dimensional Touch Pad	Yes	No	No	Yes					
Elongated Button	Yes	No	No	Yes					
Touch Screen with Graphical Slider	Yes	No	Yes	Yes					
Jog Wheel	No	Yes	Yes	Yes					
Scroll Wheel	No	No	Yes	Yes					
Thumb Wheel	No	No	Yes	Yes					
Linear Sliding Knob	No	Yes	No	Yes					
Touch Screen with Graphical Radio Buttons	Yes	No	Yes	Yes					
Dedicated Buttons on Keyboard	Yes	No	No	No					
Two-Dimensional Touch Pad	Yes	No	No	No					

Figure 5A

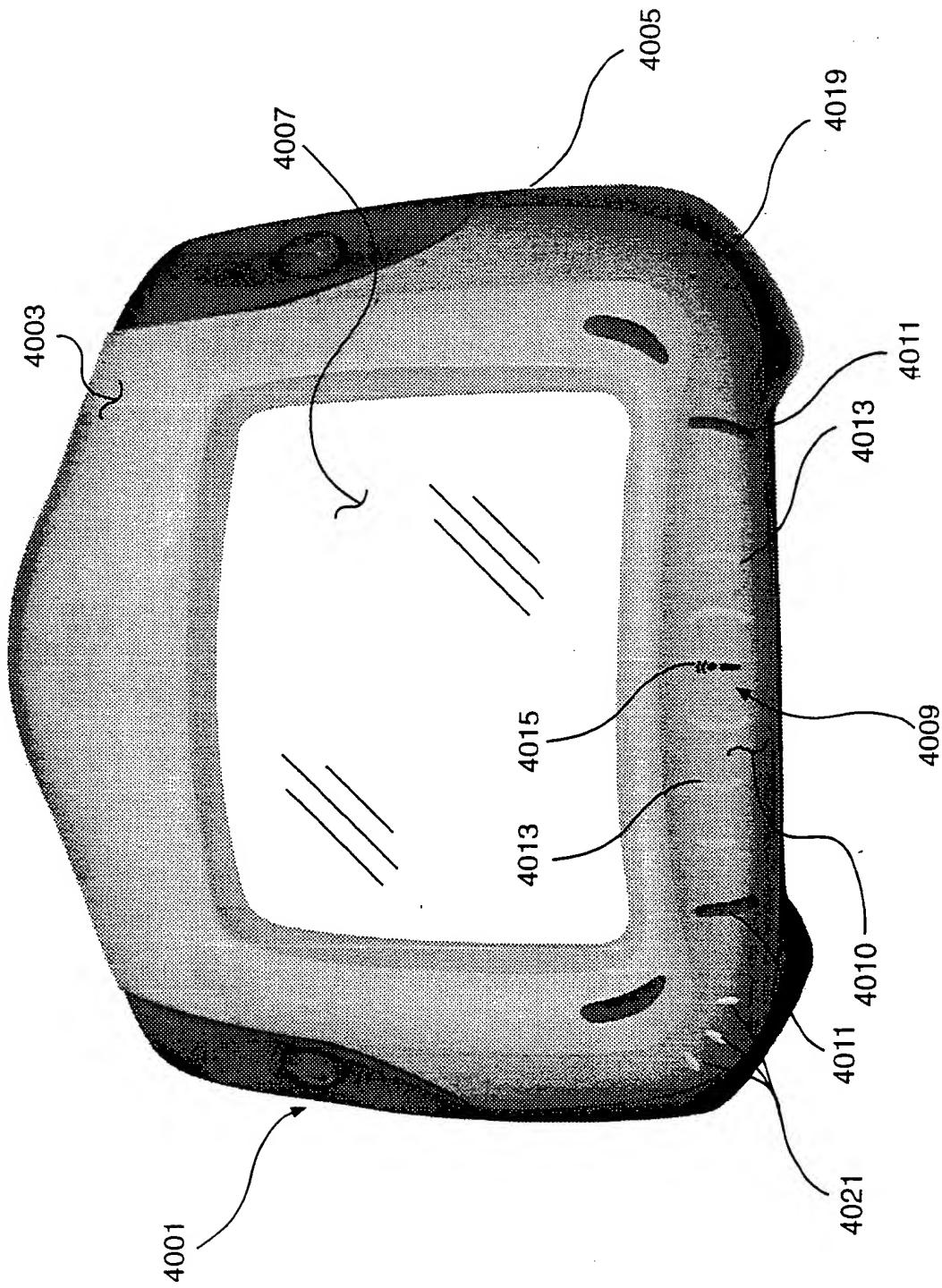


Figure 6A

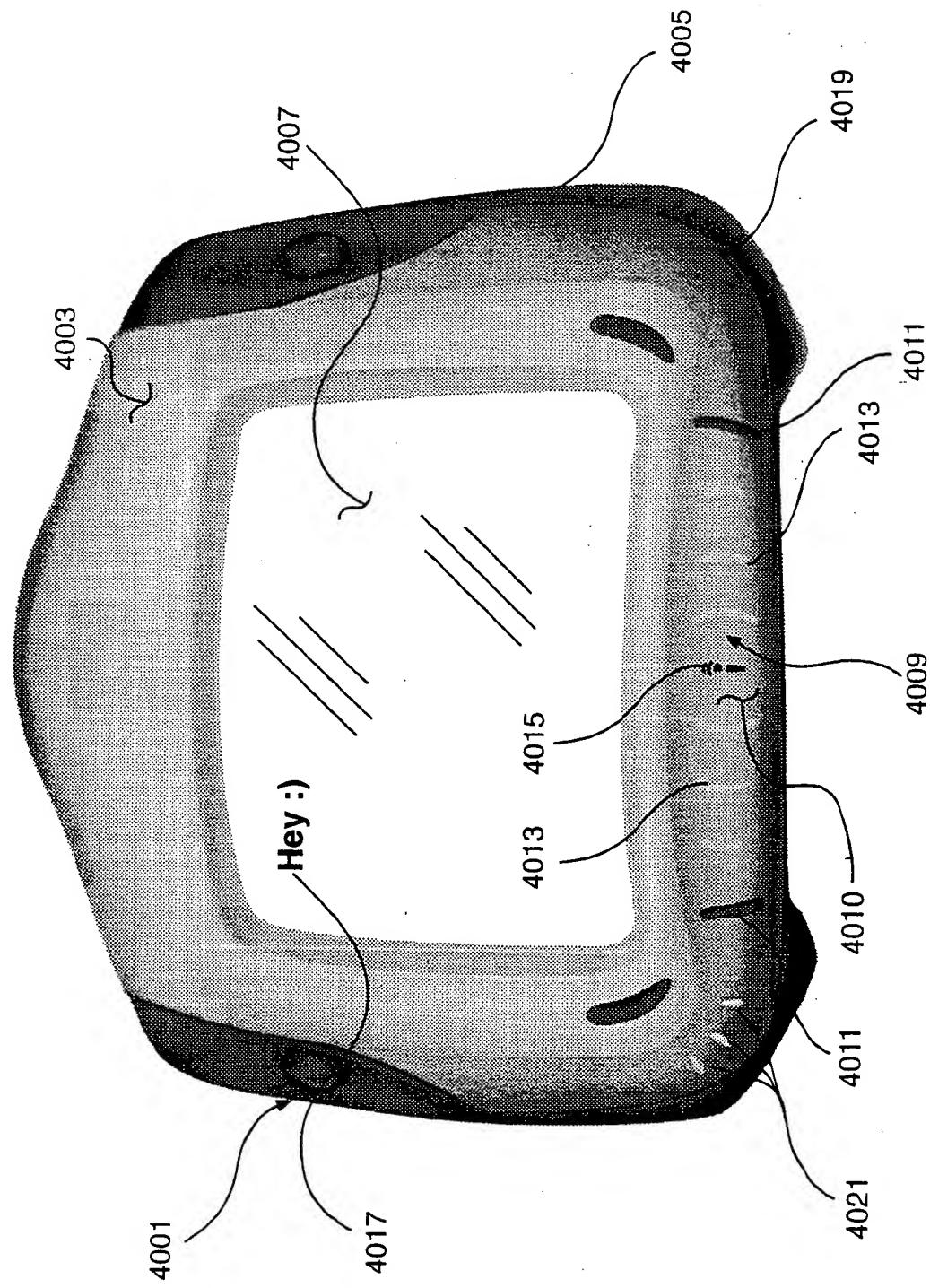
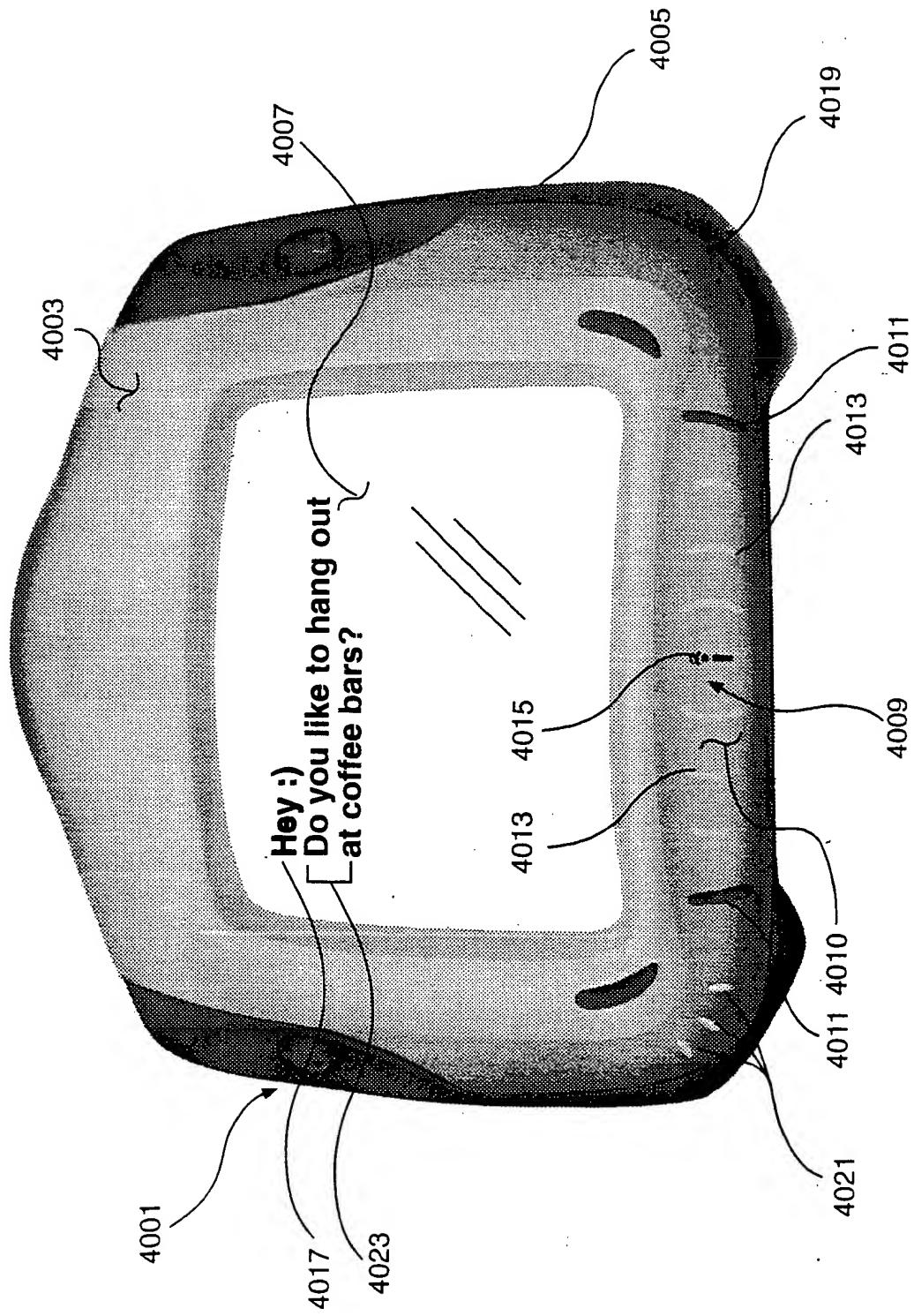


Figure 6B

Figure 6C



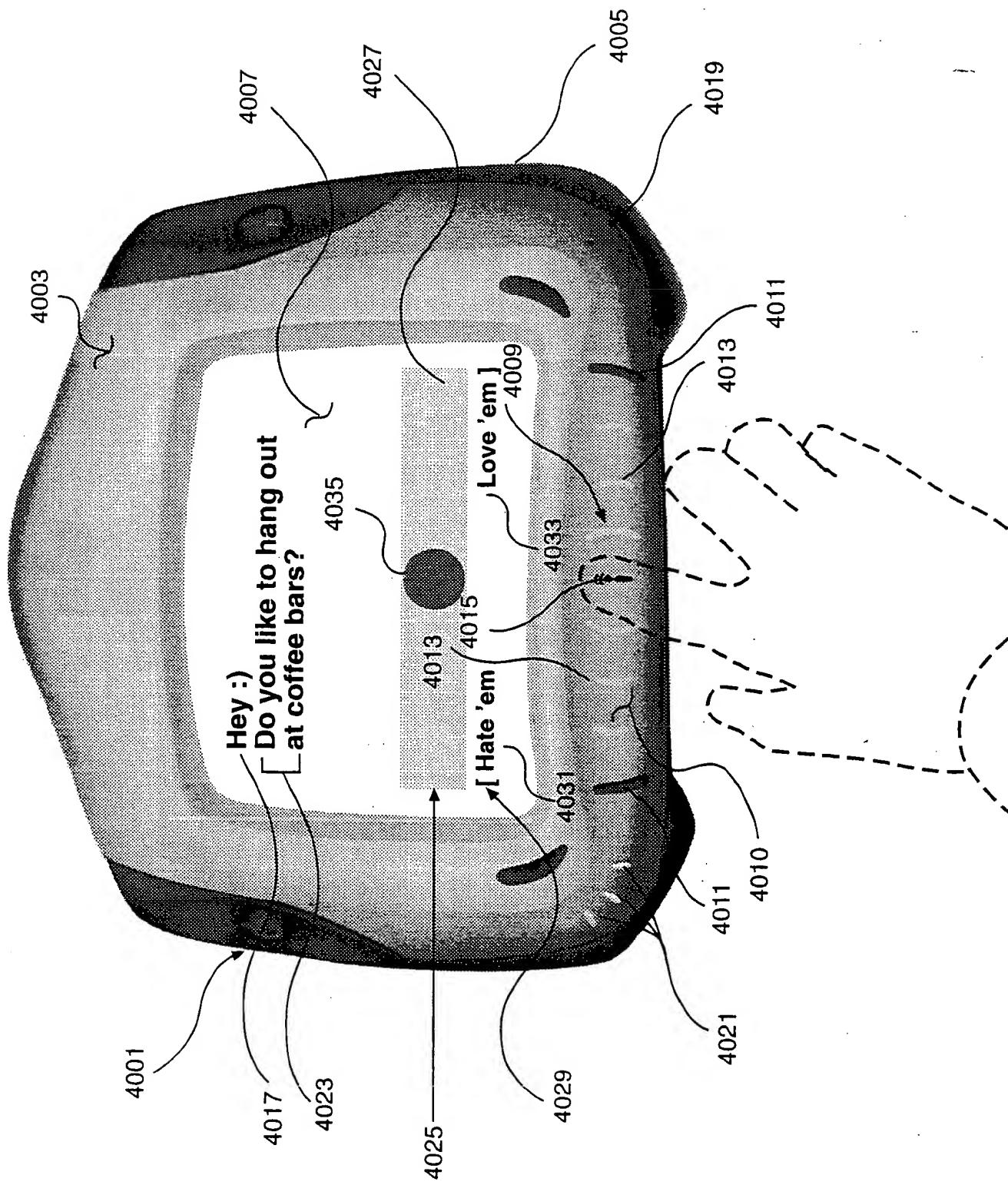


Figure 6D

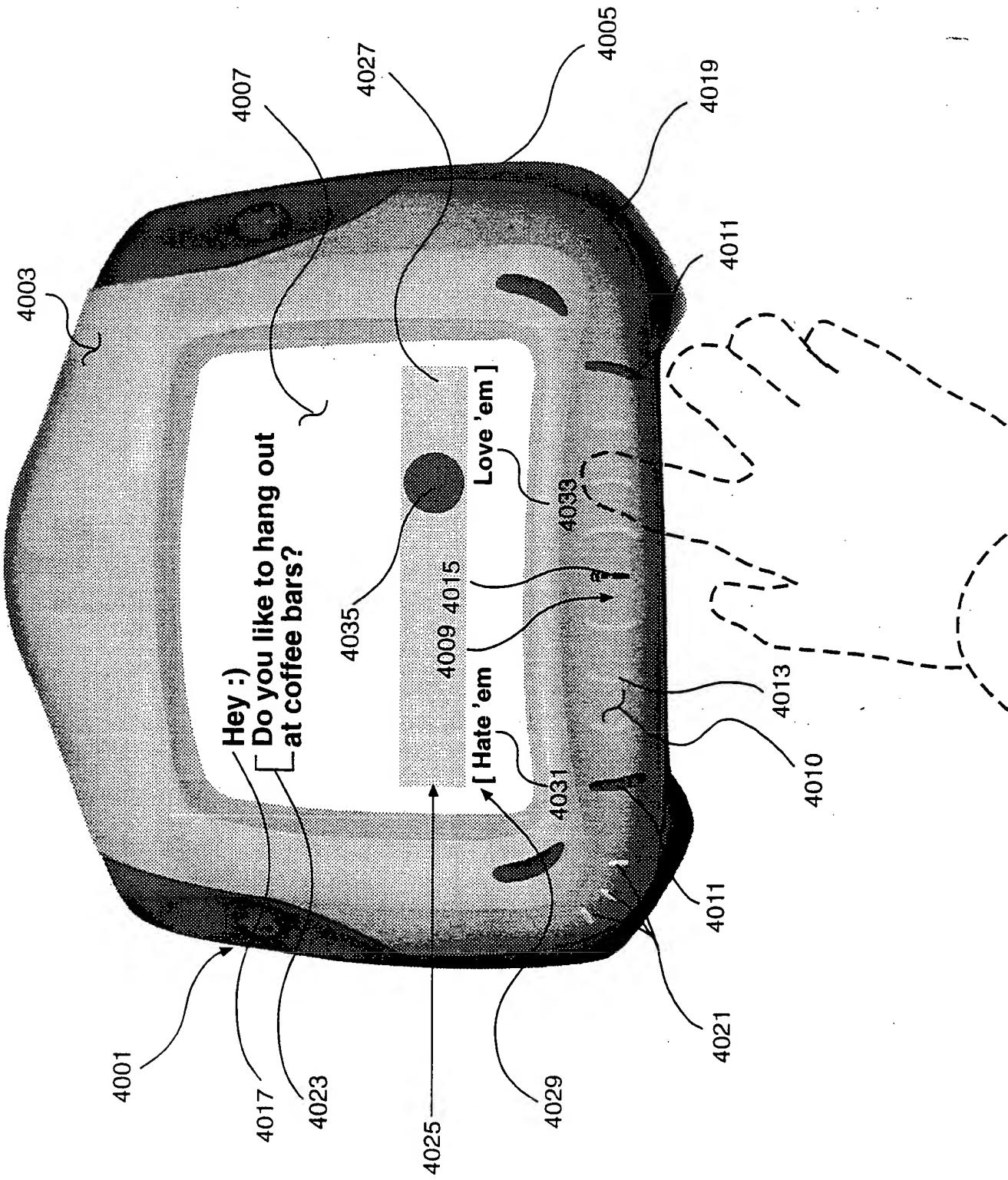


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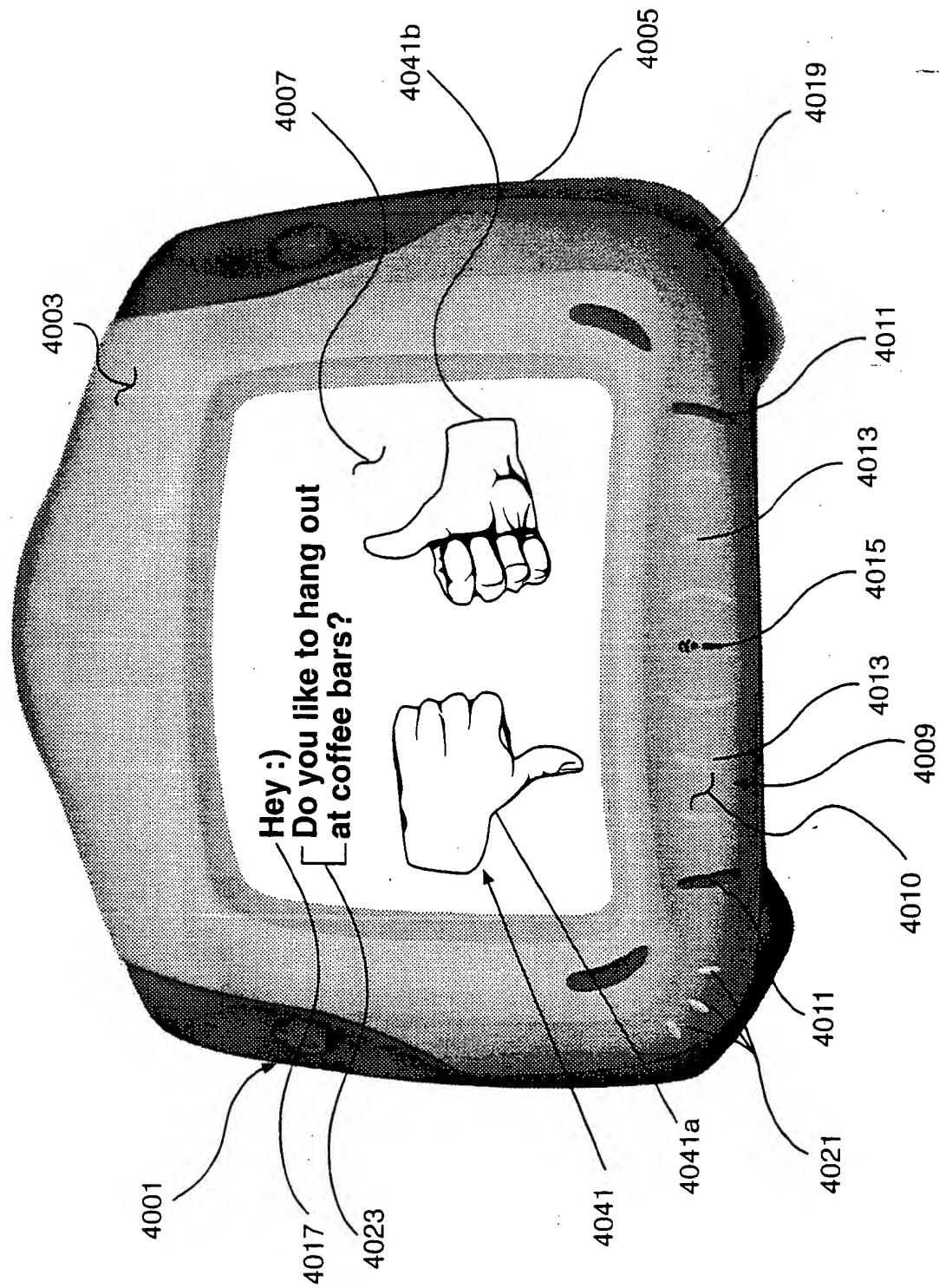


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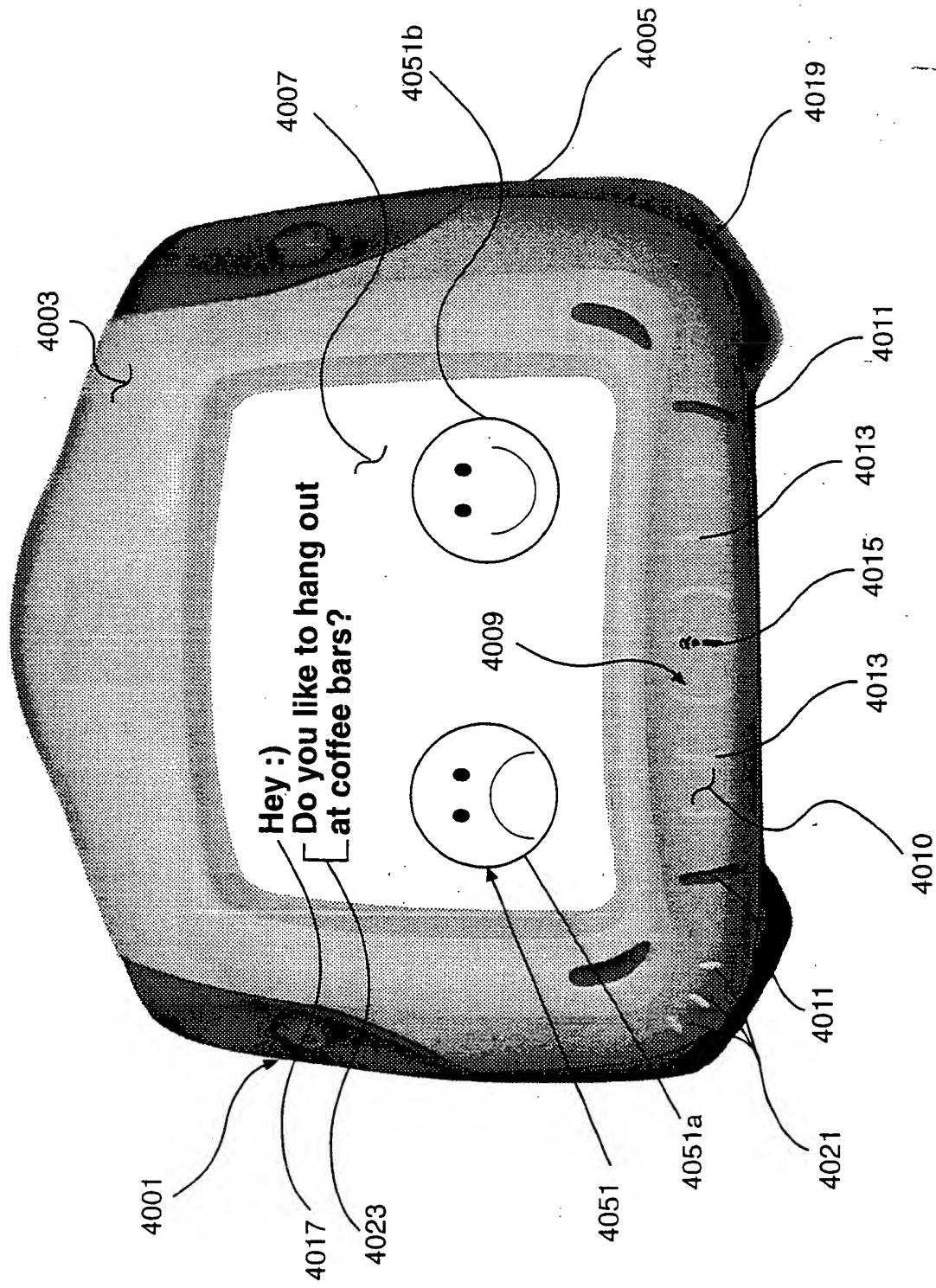
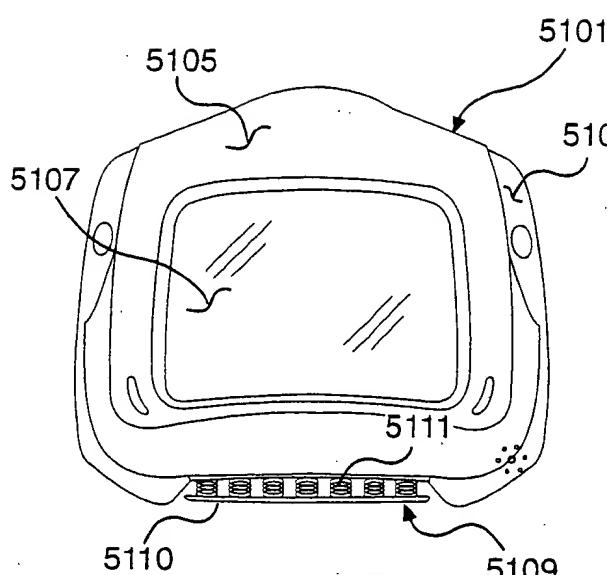
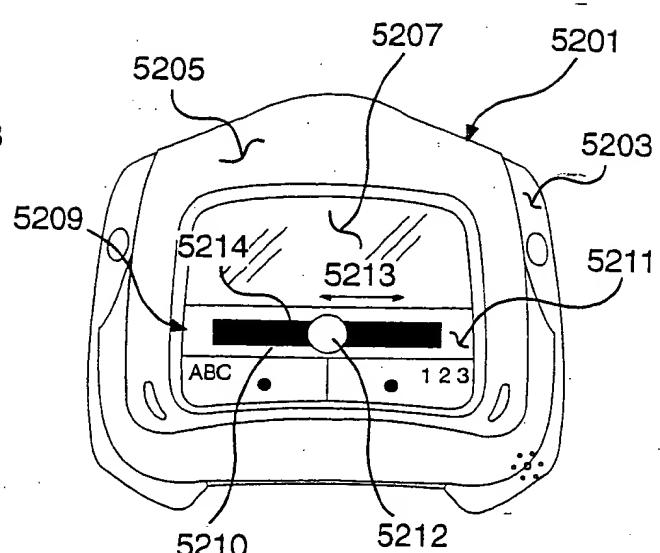


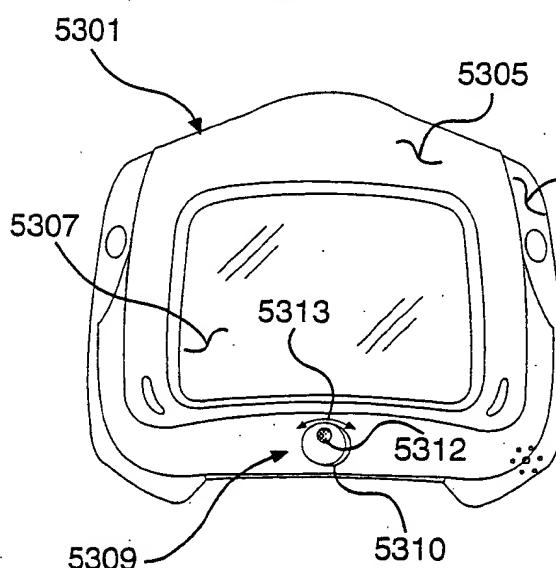
Figure 6G



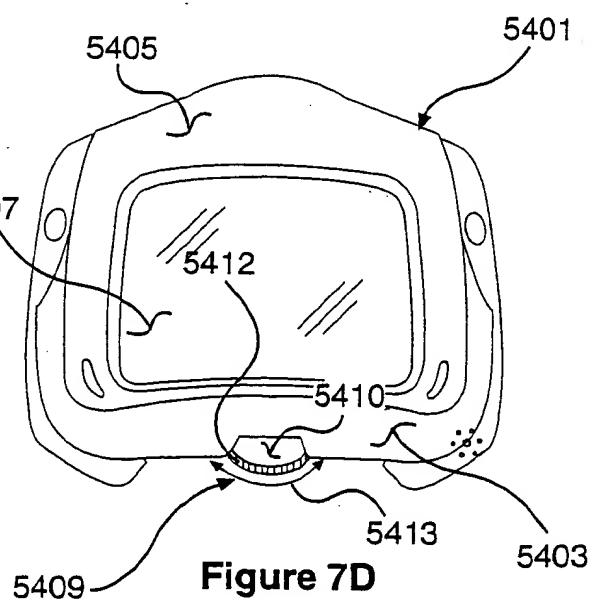
**Figure 7A**



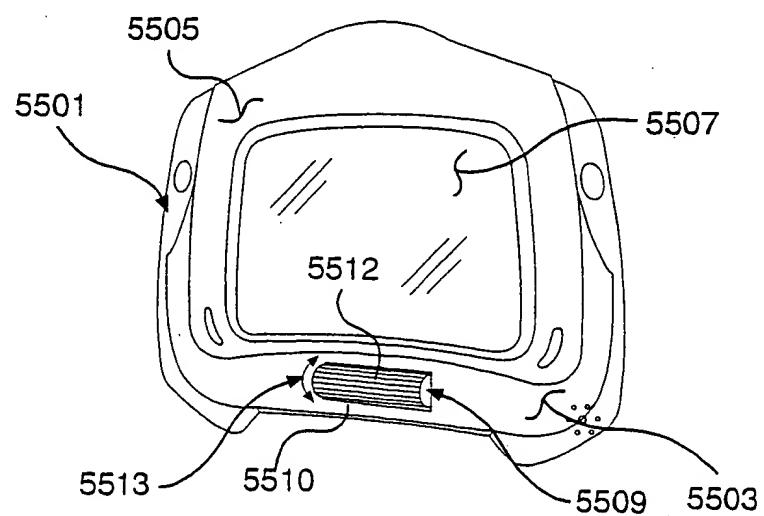
**Figure 7B**



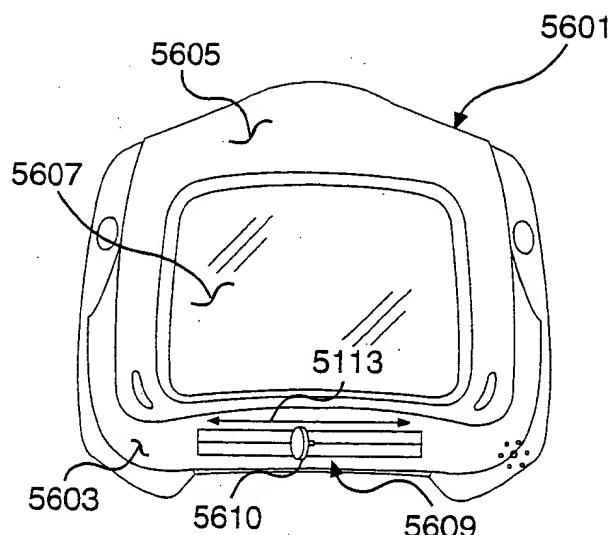
**Figure 7C**



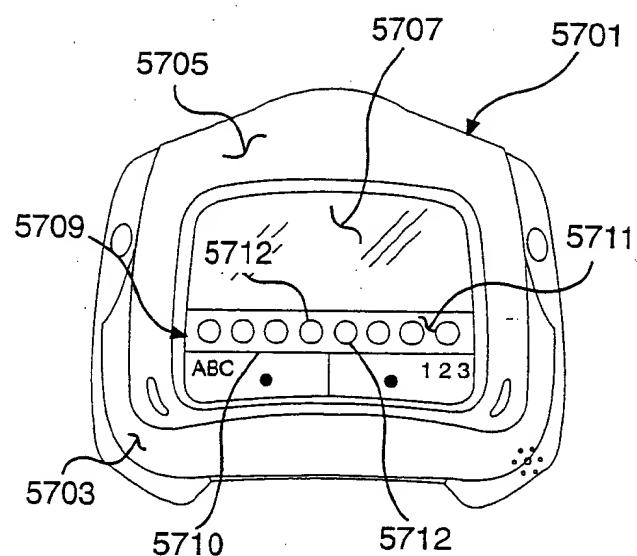
**Figure 7D**



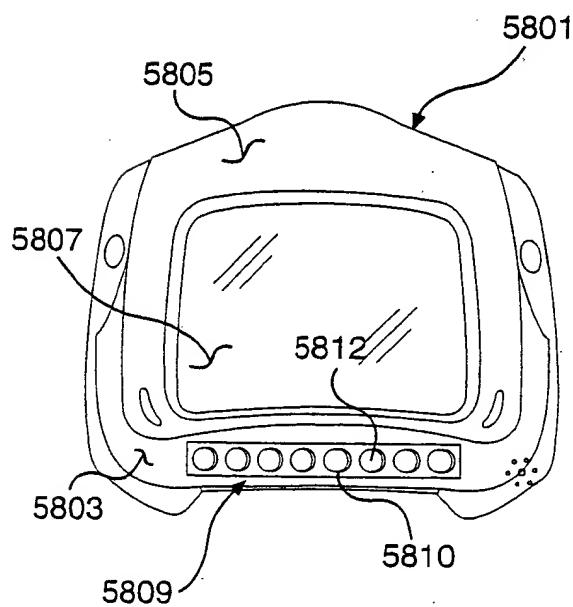
**Figure 7E**



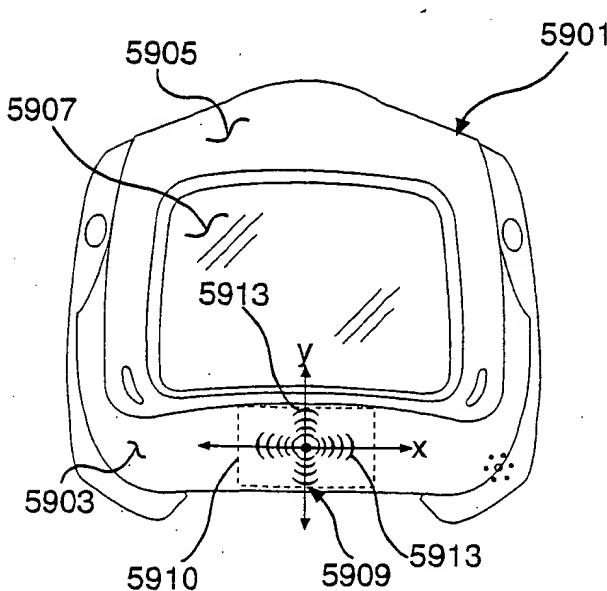
**Figure 7F**



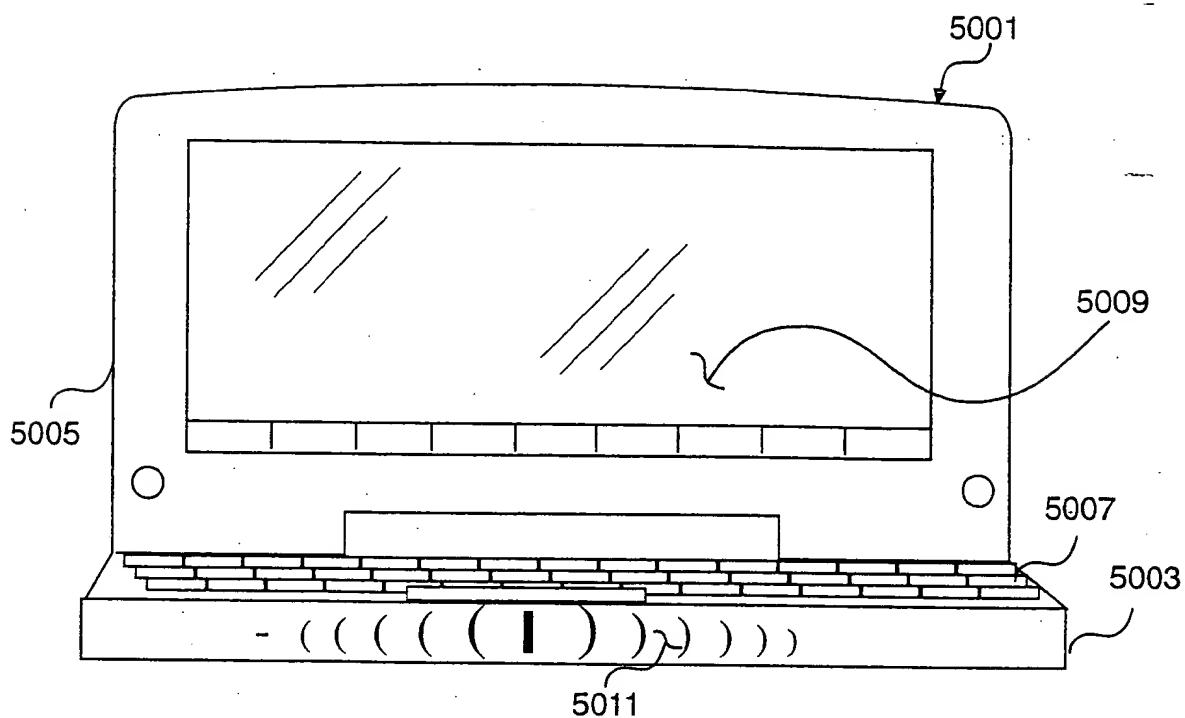
**Figure 7G**



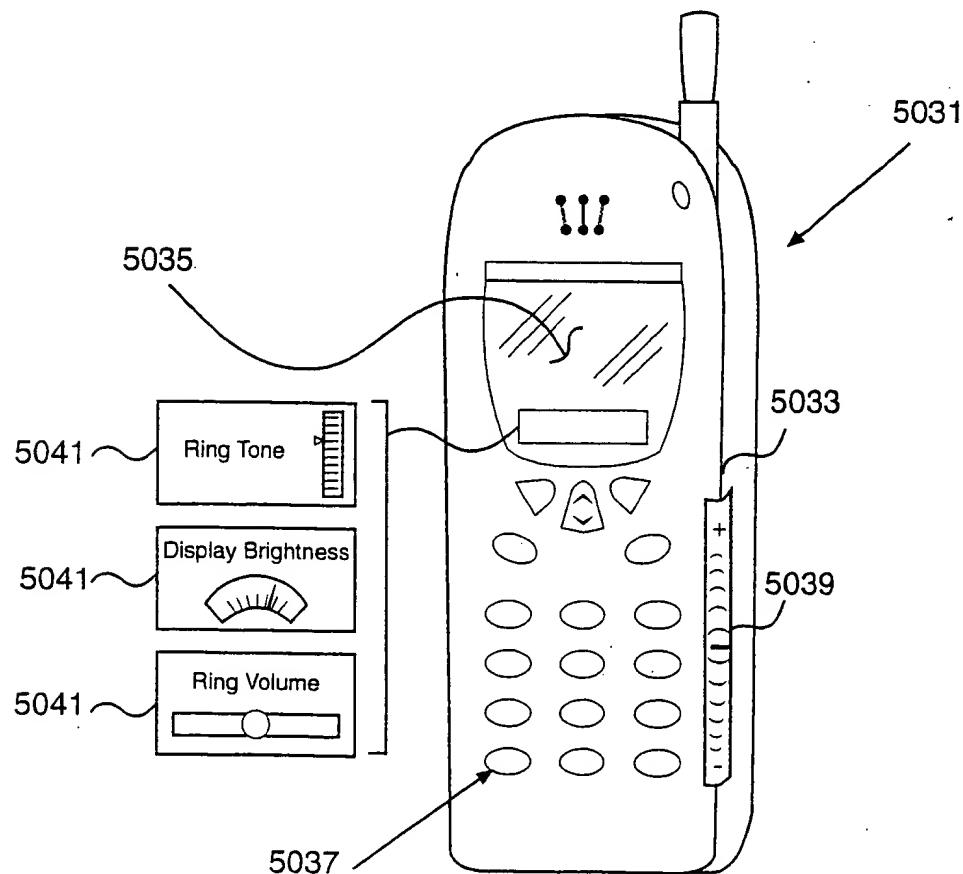
**Figure 7H**



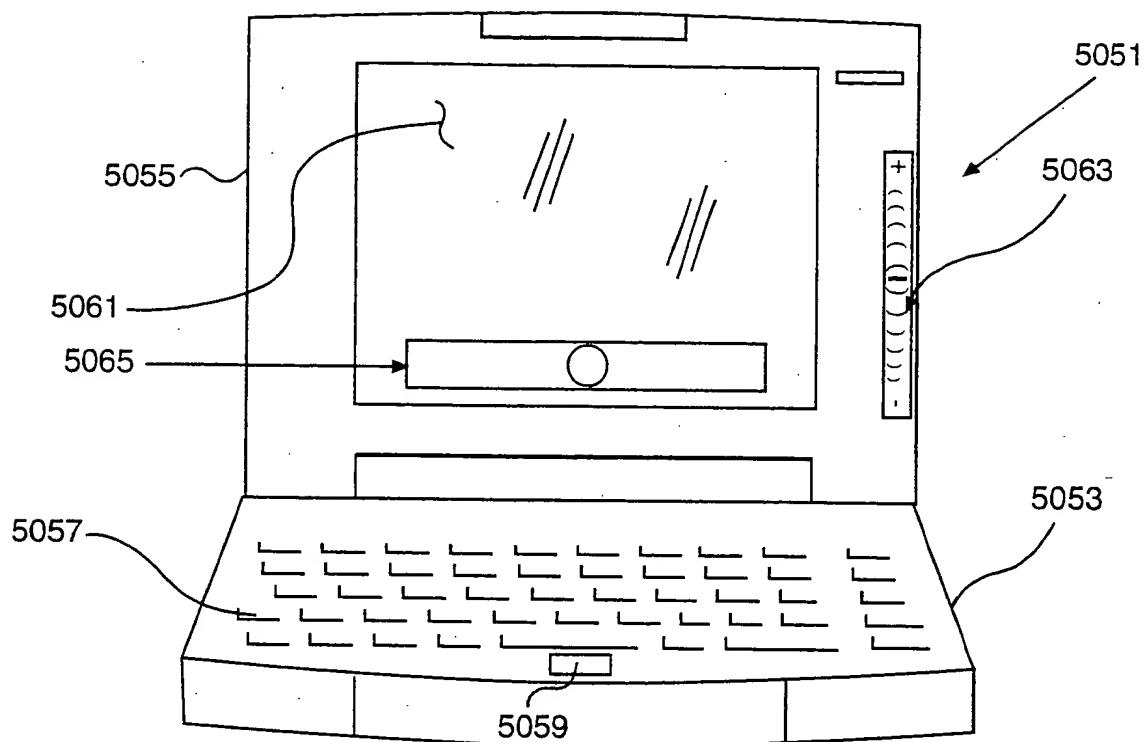
**Figure 71**



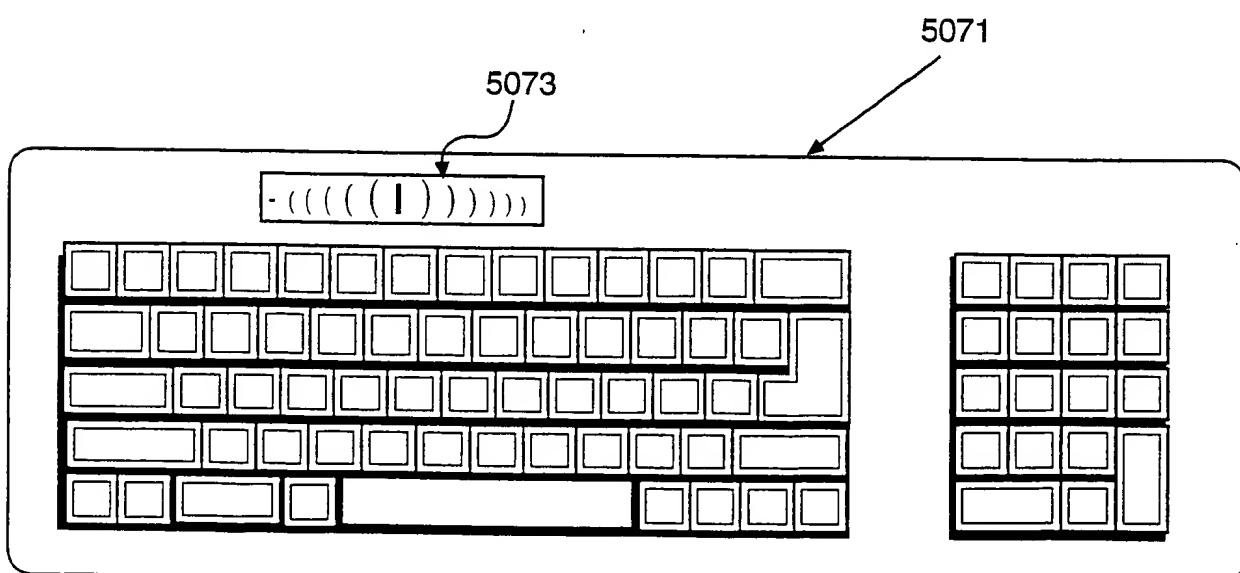
**Figure 8A**



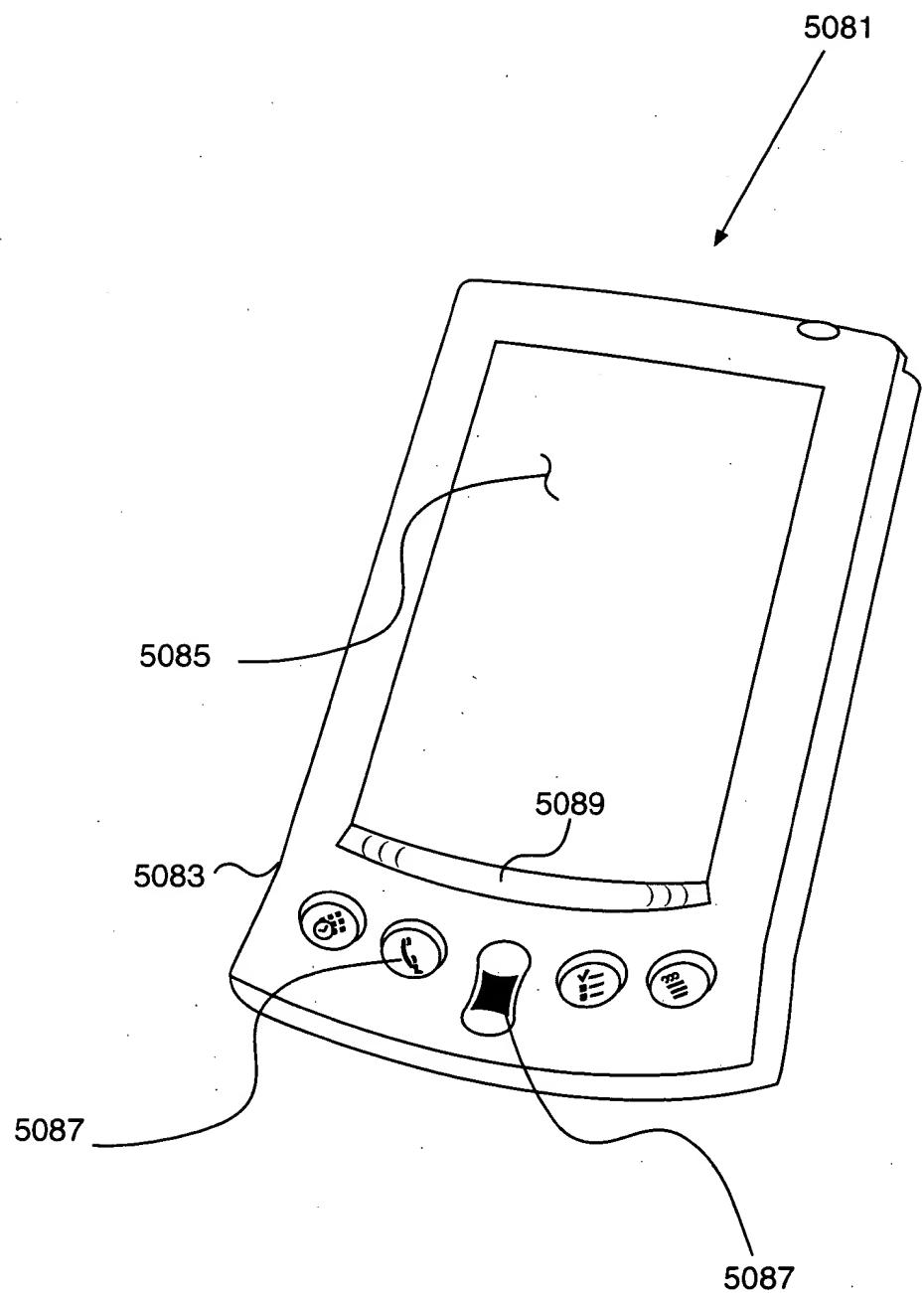
**Figure 8B**



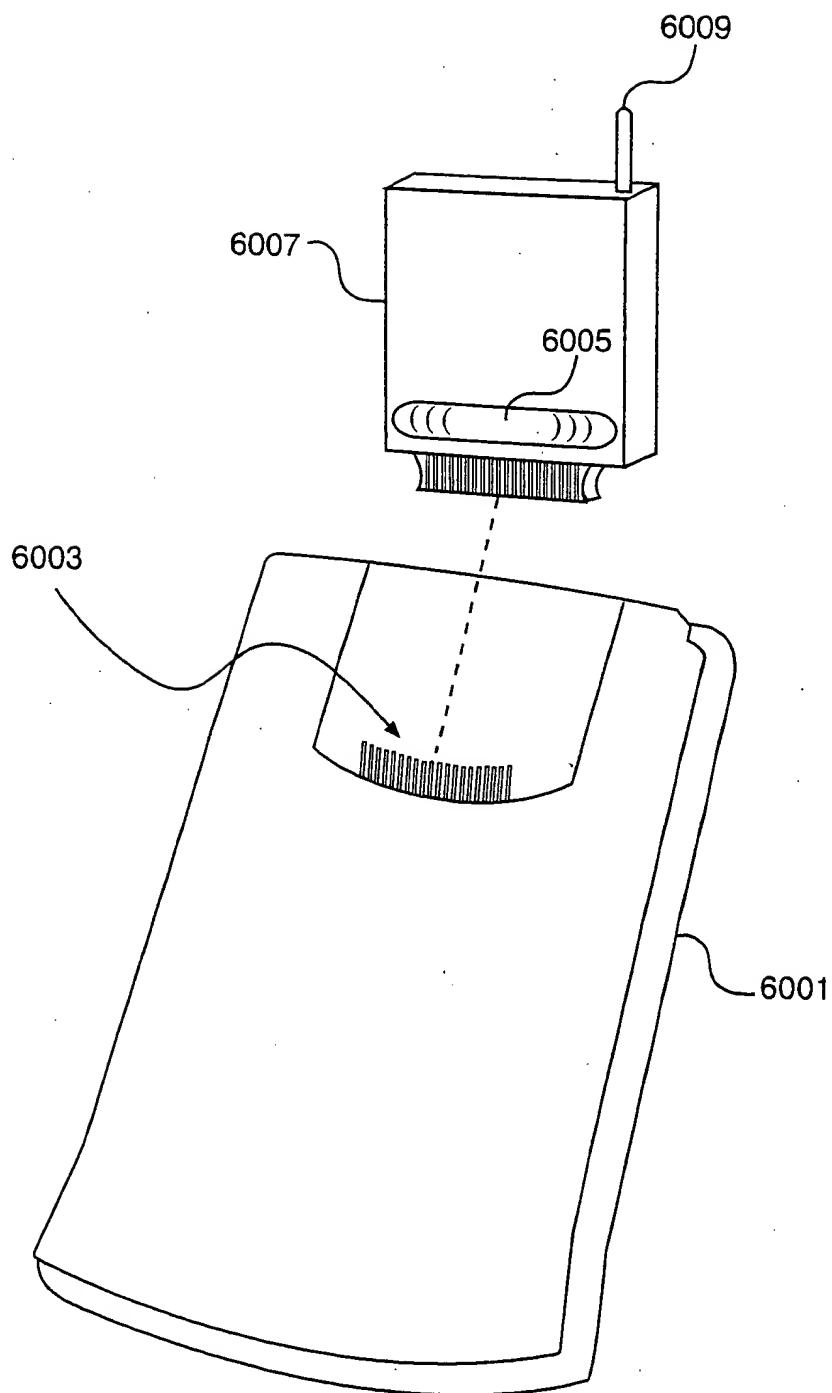
**Figure 8C**



**Figure 8D**



**Figure 8E**



**Figure 9**

### Age \* Sex Crosstabulation

Age	Male	Female	Total
12	154	133	287
13	154	161	315
14	155	116	271
15	131	133	264
16	100	98	198
17	104	117	221
18	80	60	140
19	10	9	19
Total	888	827	1715

Fig 10A

### Race \* Sex Crosstabulation

Race		Male	Female	Total
White	N	783	714	1497
	%w/in race	52.30	47.70	100.00
Black	N	91	94	185
	%w/in race	49.19	50.81	100.00
Oriental	N	4	4	8
	%w/in race	50.00	50.00	100.00
American Indian	N	4		4
	%w/in race	100.00		100.00
Other	N	6	13	19
	%w/in race	31.58	68.42	100.00
Total	N	888	825	1713
	%w/in race	51.84	48.16	100.00

Fig 10B

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Thumb Length

	N	Mean	Std Dev	1st	5th	50th	95th	99th
Total Males	292	6.3	0.7	5.0	5.3	6.3	7.3	8.1
Total Females	285	6.0	0.5	4.8	5.1	5.9	6.8	7.1
Males 12-15	196	6.1	0.6	5.0	5.2	6.1	7.1	7.8
Males 16-19	96	6.7	0.6	5.5	5.9	6.7	7.5	.
Females 12-15	198	5.9	0.5	4.7	5.0	5.9	6.8	7.0
Females 16-19	87	6.1	0.5	5.1	5.3	6.2	6.9	.

Fig. 10c

Thumb Length: Males

Age	N	Mean	Std Dev	Percentiles				
				1st	5th	50th	95th	99th
12	46	5.7	0.4	4.9	5.0	5.7	6.3	.
13	46	6.0	0.5	5.1	5.2	5.9	6.9	.
14	54	6.2	0.6	5.1	5.2	6.1	7.3	.
15	50	6.6	0.4	5.5	5.9	6.6	7.3	.
16	31	6.6	0.4	5.7	5.9	6.6	7.1	.
17	38	6.8	0.7	5.5	5.8	6.8	7.9	.
18	25	6.8	0.4	6.2	6.2	6.9	7.5	.
19	2	7.6	0.8	7.0	7.0	7.6	.	.

Fig. 10d

Thumb Length: Females

Age	Valid N	Mean	Std Dev	Percentiles				
				1st	5th	50th	95th	99th
12	48	5.7	0.5	4.7	4.9	5.8	6.5	.
13	61	5.9	0.5	4.6	4.9	5.8	6.6	.
14	44	5.9	0.5	4.8	5.0	5.9	6.9	.
15	45	6.1	0.4	5.4	5.4	6.0	6.9	.
16	25	6.2	0.5	5.1	5.2	6.3	7.1	.
17	42	6.0	0.5	5.1	5.2	6.0	7.0	.
18	16	6.2	0.3	5.7	5.7	6.2	.	.
19	4	6.1	0.3	5.7	5.7	6.1	.	.

Fig. 10e

Percentiles  
10th 25th 50th 75th 90th

Fig. 10F

Correlations: Total

		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.770
	Sig. (2-tailed)**	.	0.000
	N	577	576
HAND LENGTH	Pearson Correlation	0.770	1
	Sig. (2-tailed)**	0.000	.
	N	576	1707

\*\*

Correlation is significant at the 0.01 level (2-tailed)\*\*.

Fig. 10G

Correlations: Male

		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.790
	Sig. (2-tailed)**	.	0.000
	N	292	291
HAND LENGTH	Pearson Correlation	0.790	1
	Sig. (2-tailed)**	0.000	.
	N	291	882

\*\*

Correlation is significant at the 0.01 level (2-tailed)\*\*.

Correlations: Female

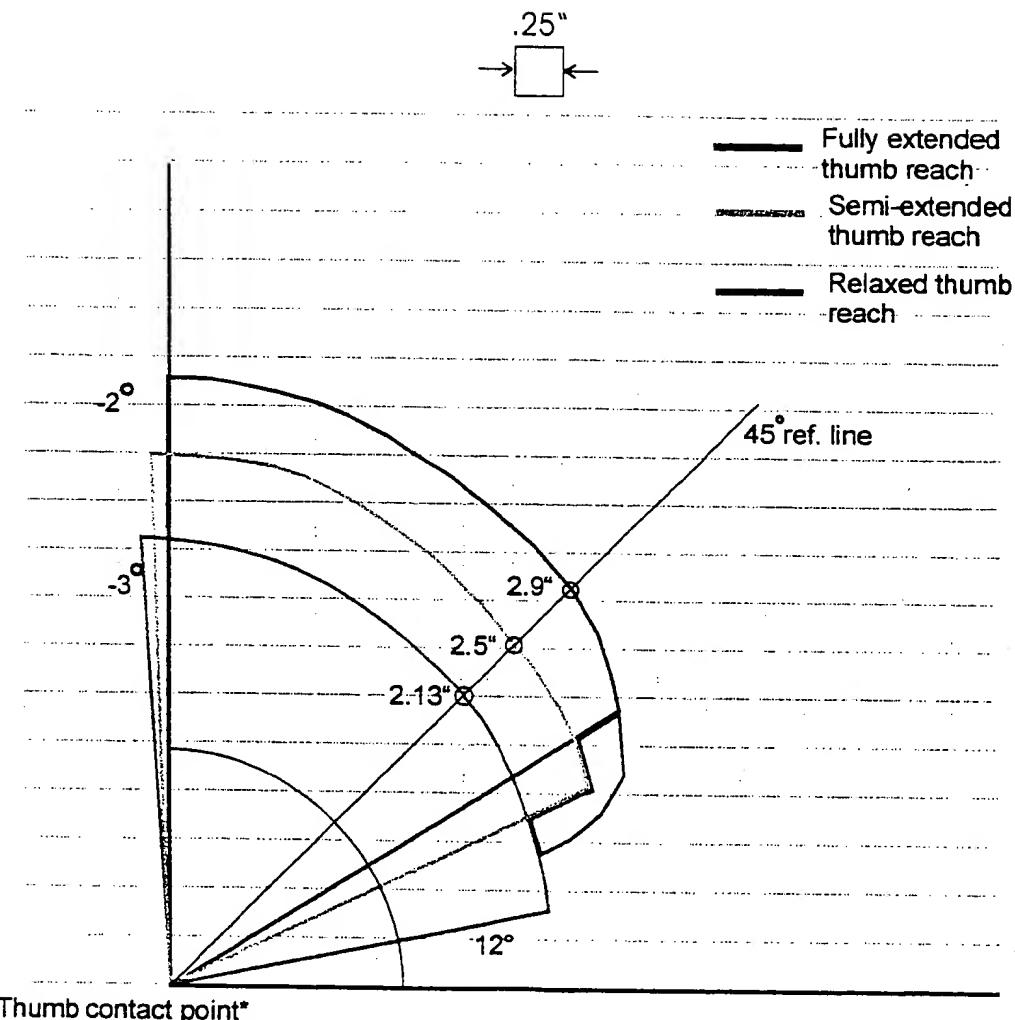
		THUMB LENGTH	HAND LENGTH
THUMB LENGTH	Pearson Correlation	1	0.657
	Sig. (2-tailed)**	.	0.000
	N	285	285
HAND LENGTH	Pearson Correlation	0.657	1
	Sig. (2-tailed)**	0.000	.
	N	285	825

\*\*

Correlation is significant at the 0.01 level (2-tailed)\*\*.

Fig. 10H

OCTOBER 2012



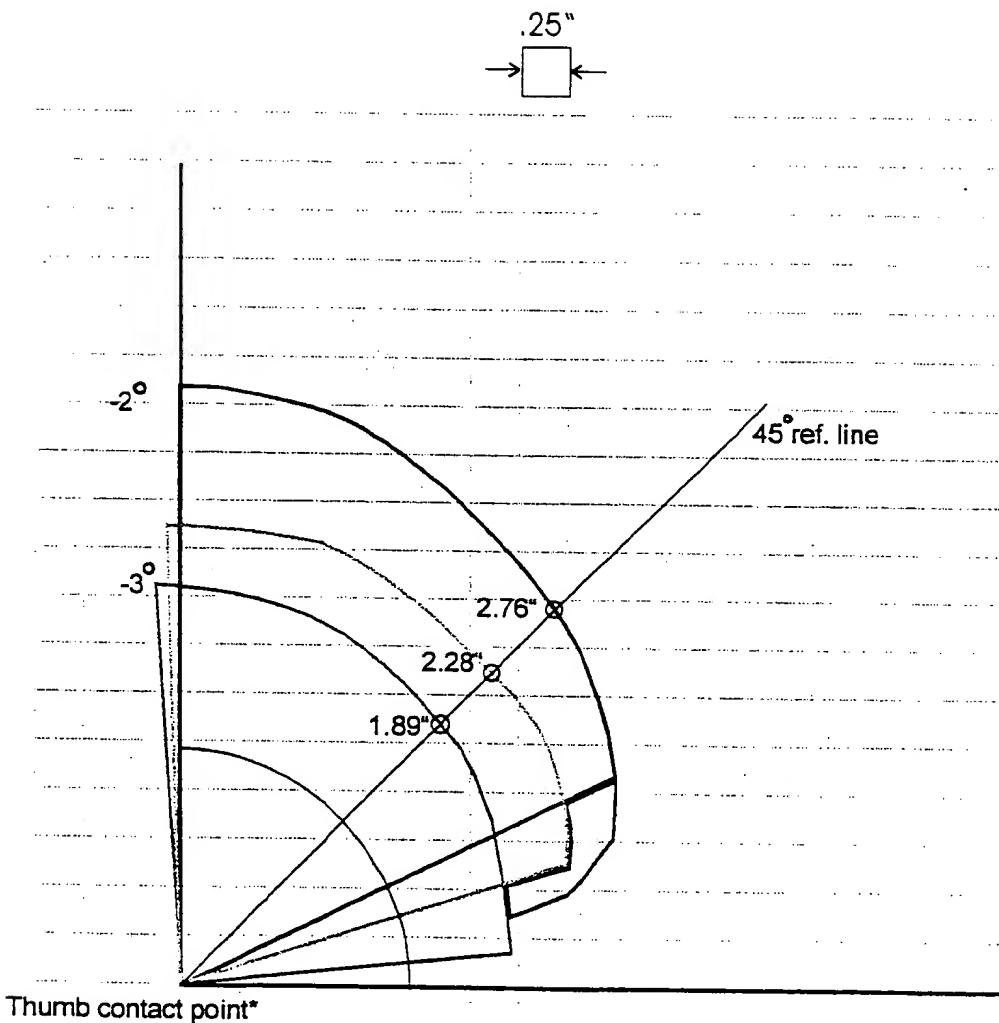
1st Percentile Left Thumb Sweeps, Females Age 12-19  
(Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10I

C23

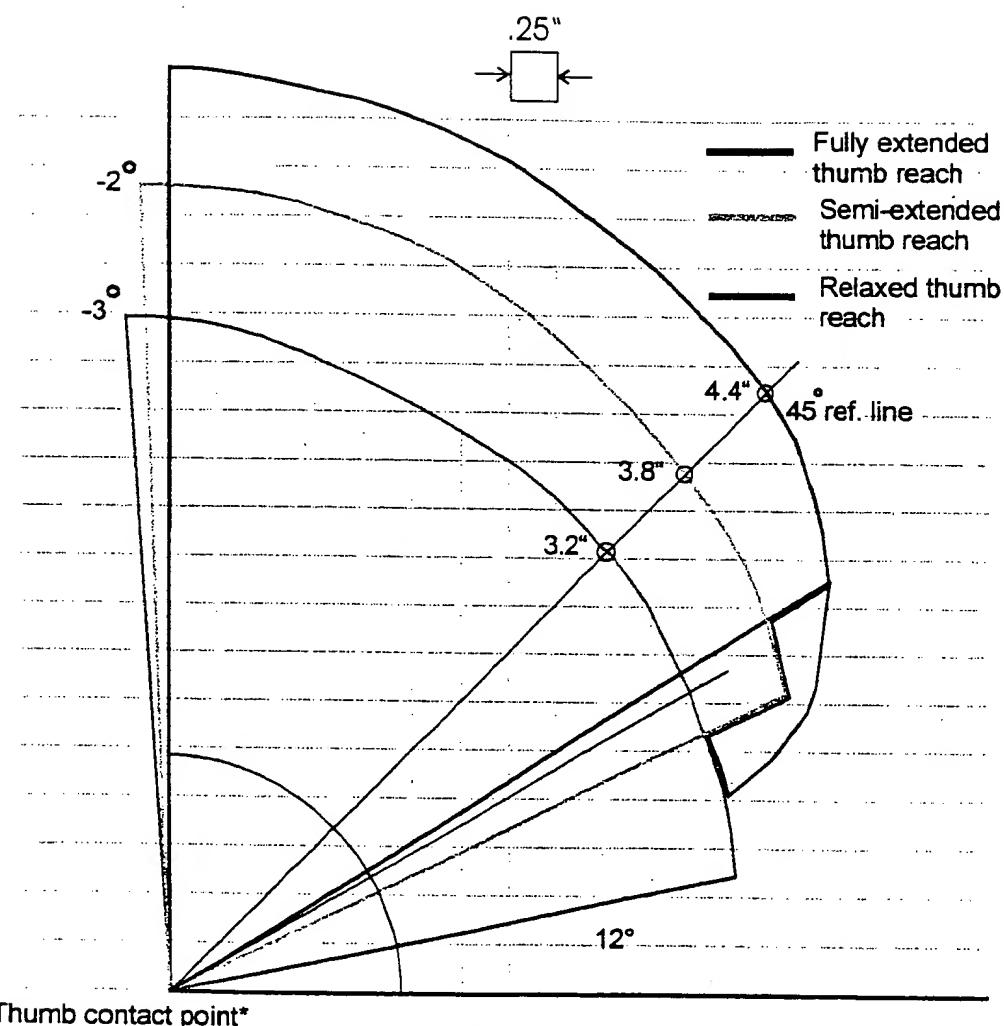


1st Percentile Left Thumb Sweeps, Females Age 12-19  
(Uniform object thickness 0.75", corner radius 0.75")

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig. 10J

c24



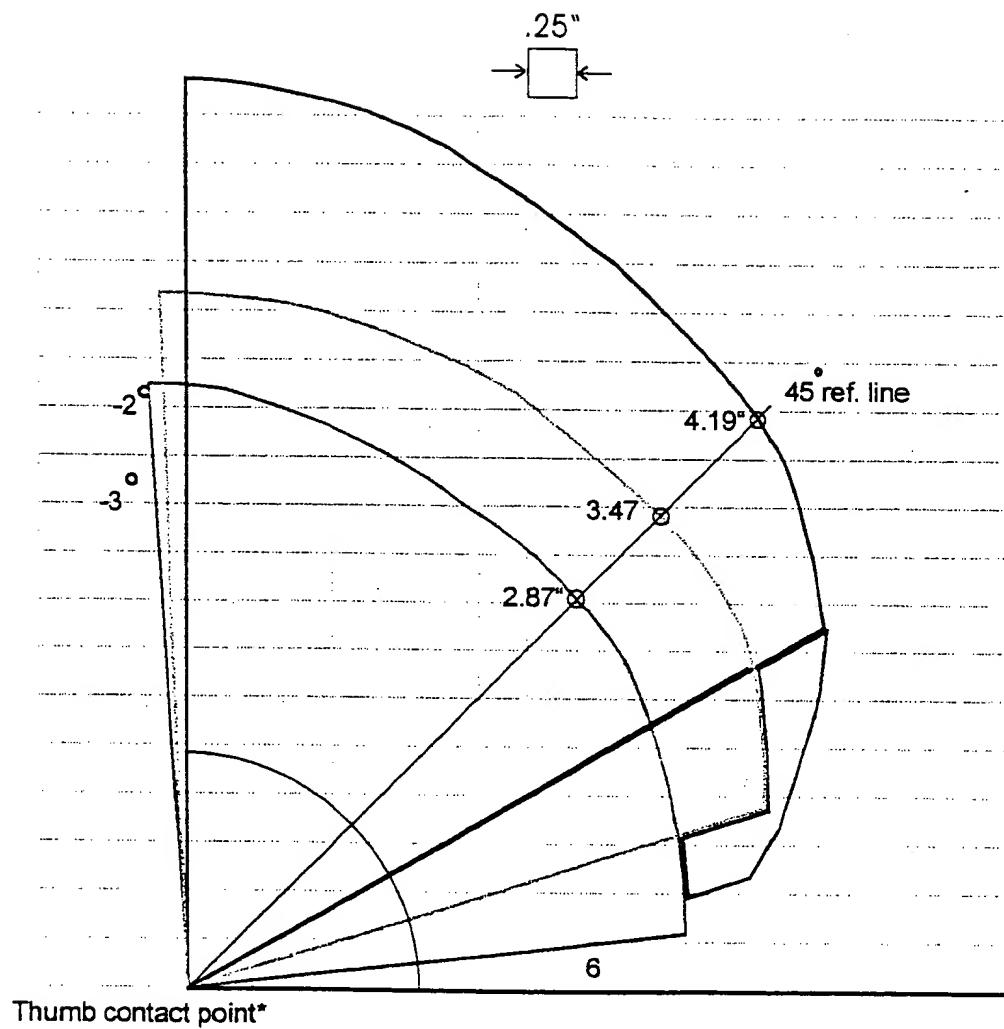
95th Percentile Left Thumb Sweeps, Male Age 12-19  
(Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10K

C25

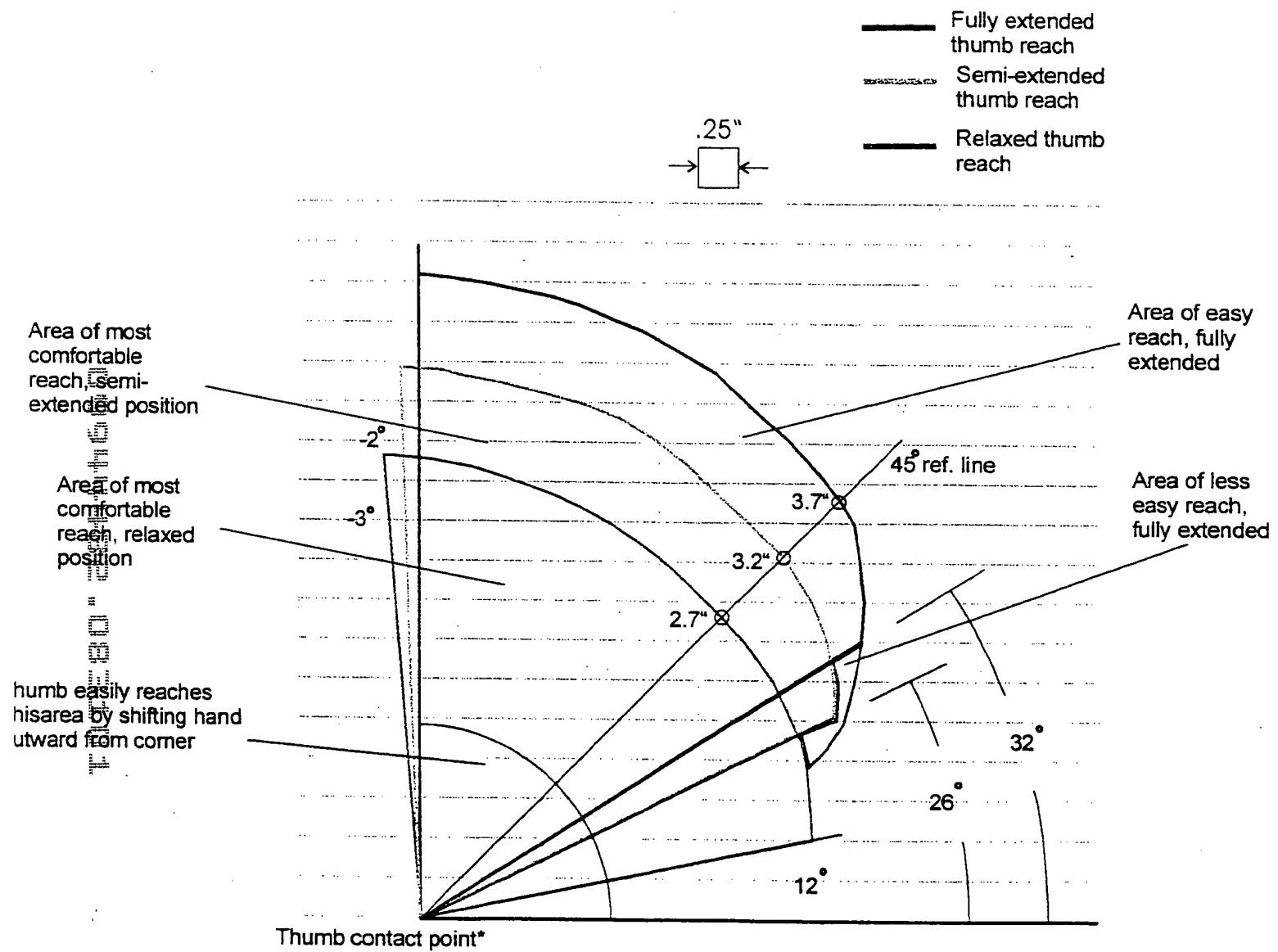


95th Percentile Left Thumb Sweeps, Male Age 12-19  
(Uniform object thickness 0.75", corner radius 0.75")

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10L

C26



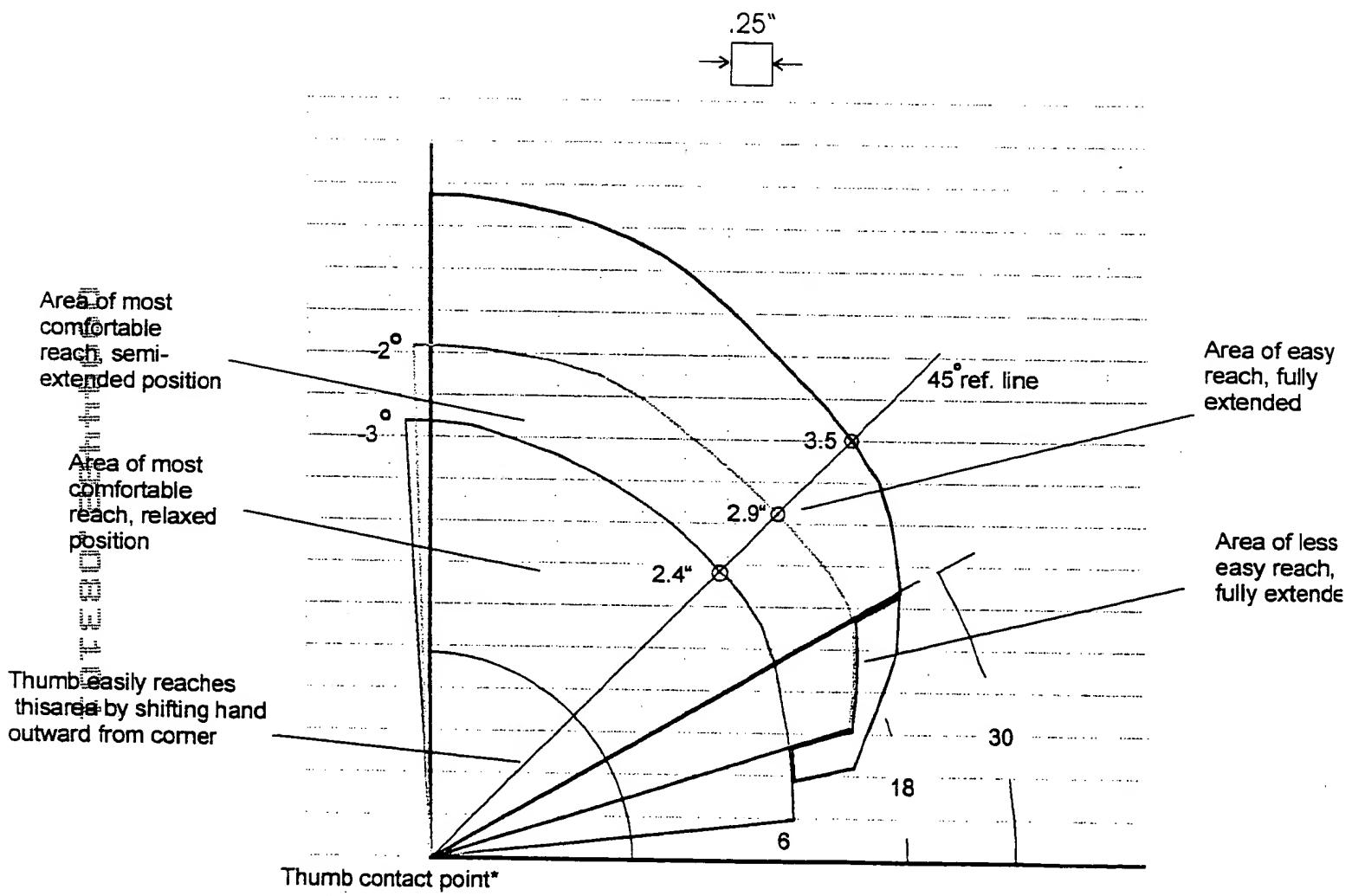
50th Percentile Left Thumb Sweeps, M+F Age 12-19  
(Uniform object thickness 0.75", corner radius 1.5")

Note: Each data point represents thumb tip at centerline of thumb

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig. 10M

C27

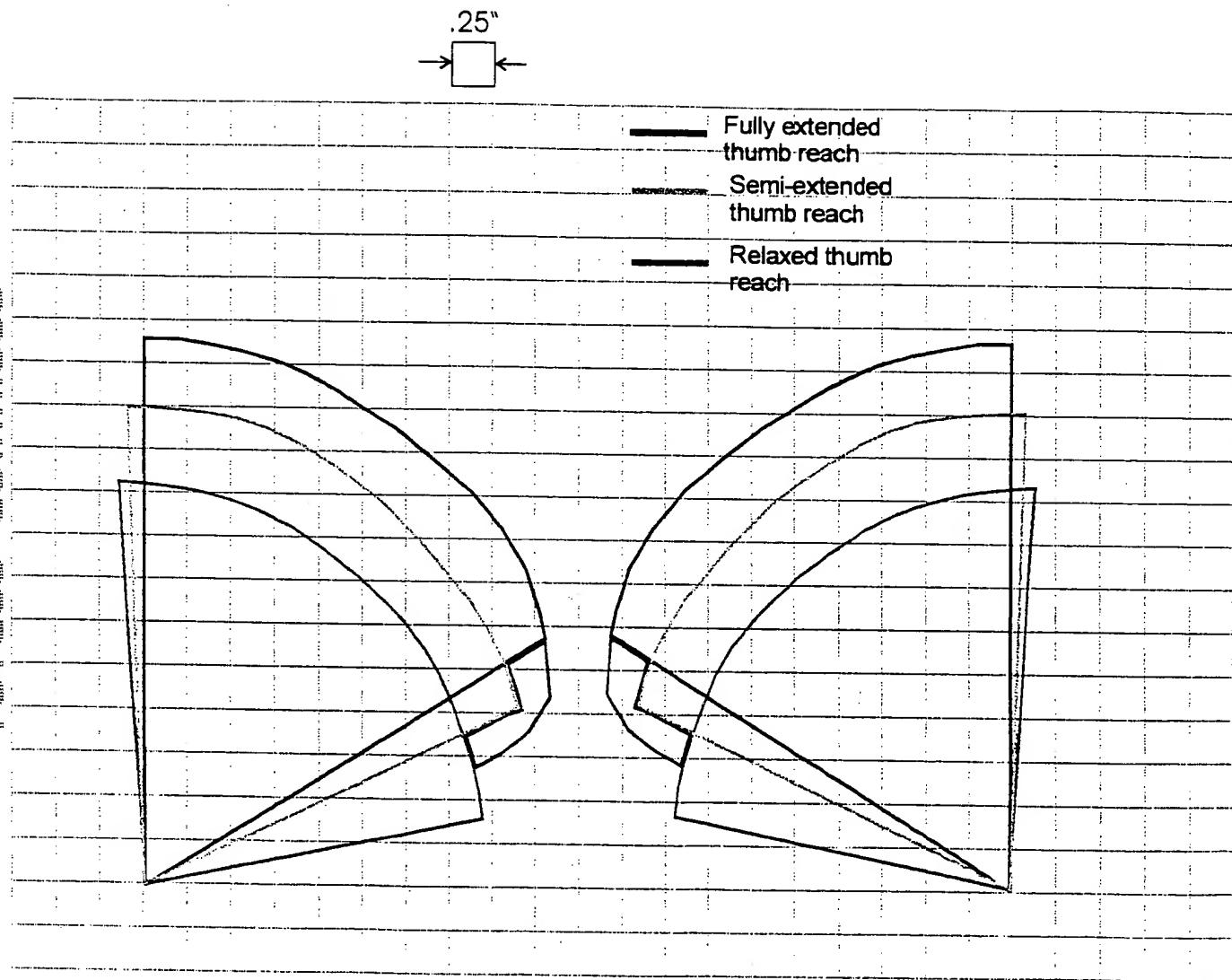


50th Percentile Left Thumb Sweeps, M+F Age 12-19  
(Uniform object thickness  $0.75"$ , corner radius  $0.75"$ )

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10N

C 28



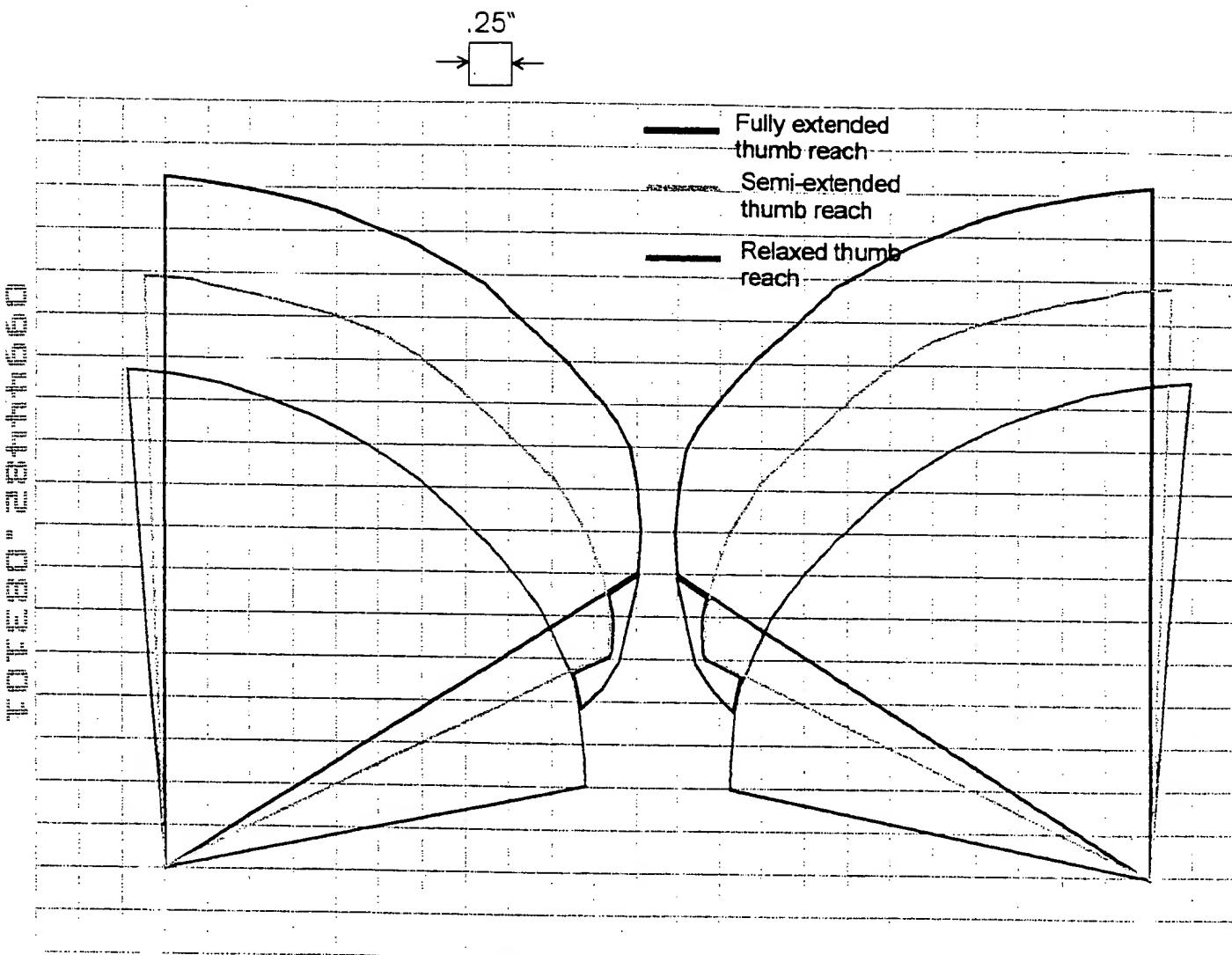
1st Percentile Combined Thumb Sweeps, Females Age 12-19  
 (Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

\* Located vertically over point of thumb base contact with corner,  
 at midpoint of lower corner radius on device

Fig 100

C29



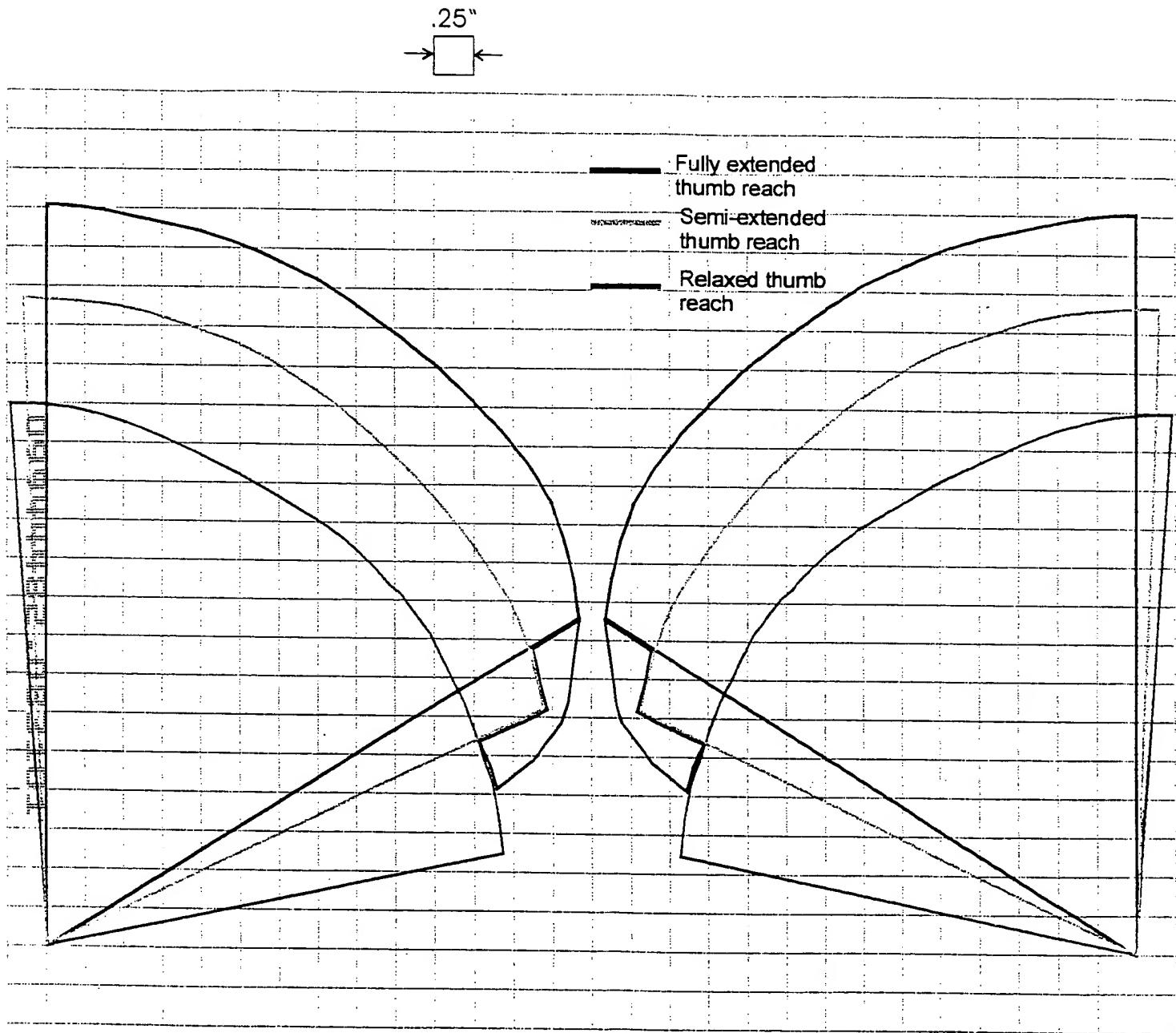
50th Percentile Combined Thumb Sweeps, Male+Females Age 12-19  
 (Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb  
 Left and right thumb envelopes are arbitrarily placed relative to each other  
 to permit cutting or measurements without overlapped reach lines

\* Located vertically over point of thumb base contact with corner,  
 at midpoint of lower corner radius on device

Fig. 10P

c30



95th Percentile Combined Thumb Sweeps, Males Age 12-19  
(Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb  
Left and right thumb envelopes are arbitrarily placed relative to each other  
to permit cutting or measurements without overlapped reach lines

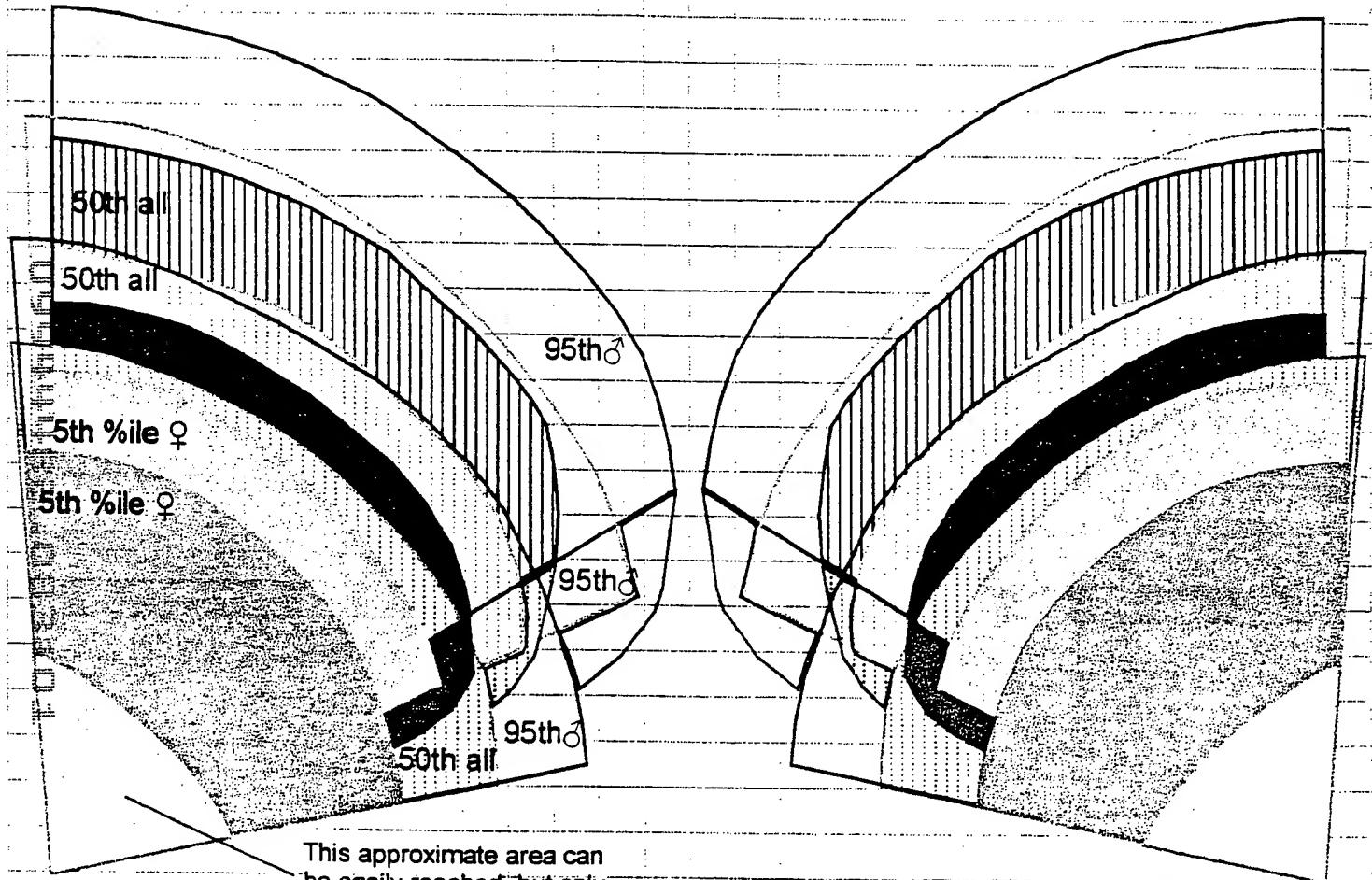
\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10Q

C31

.25"

- Fully extended thumb reach
- Semi-extended thumb reach
- Relaxed thumb reach
- Area reached with some difficulty while fully extended



### Combined Thumb Sweeps, 1st Percentile Females Through 95th Percentile Males Age 12-19

(Uniform object thickness 0.75", corner radius 1.5")

Notes: Each data point represents thumb tip at centerline of thumb

Left and right thumb envelopes are arbitrarily placed relative to each other to permit cutting or measurements without overlapped reach lines

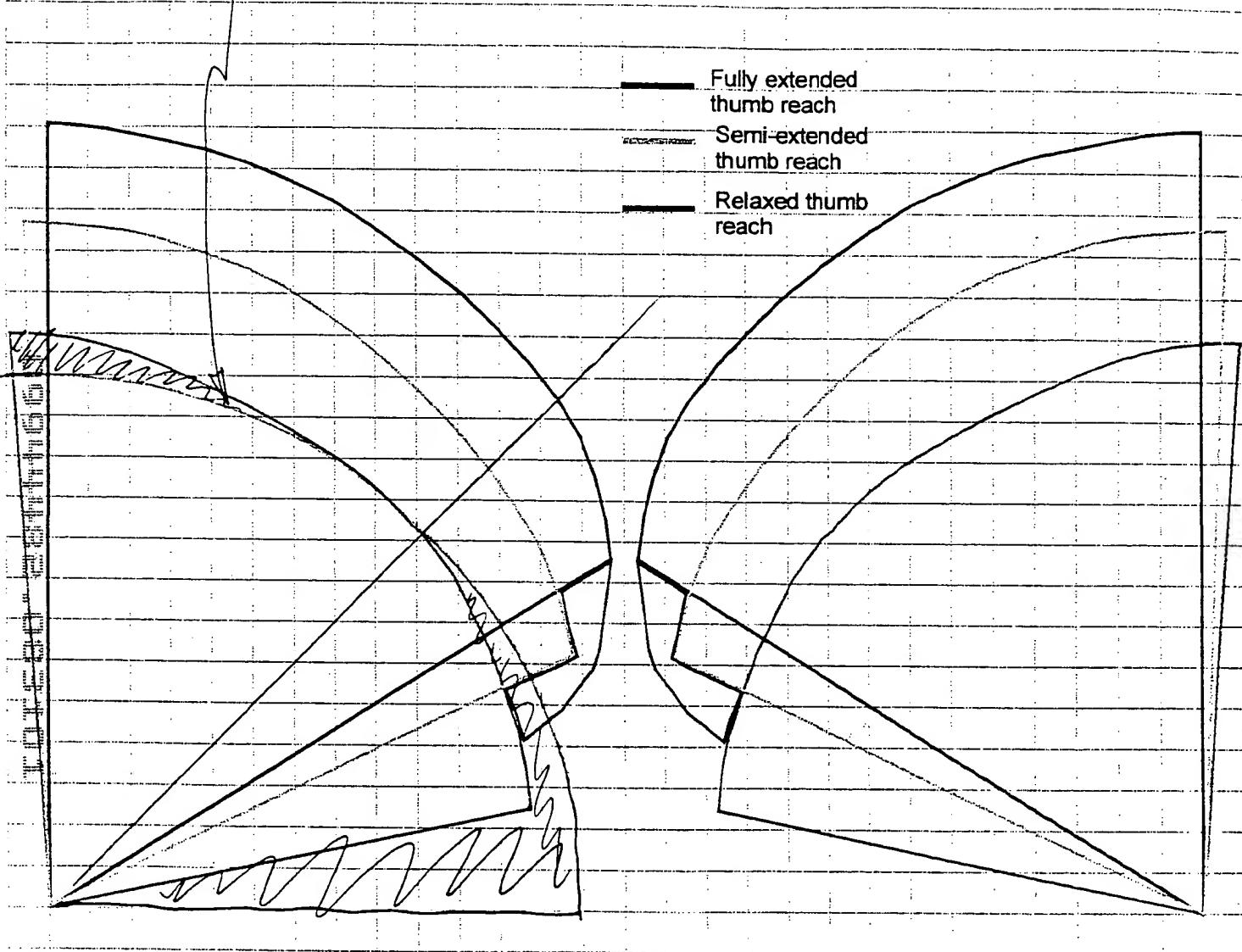
Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device

Fig 10R

C32

What  
would  
happen  
with circular  
edges

.25"  
→ 



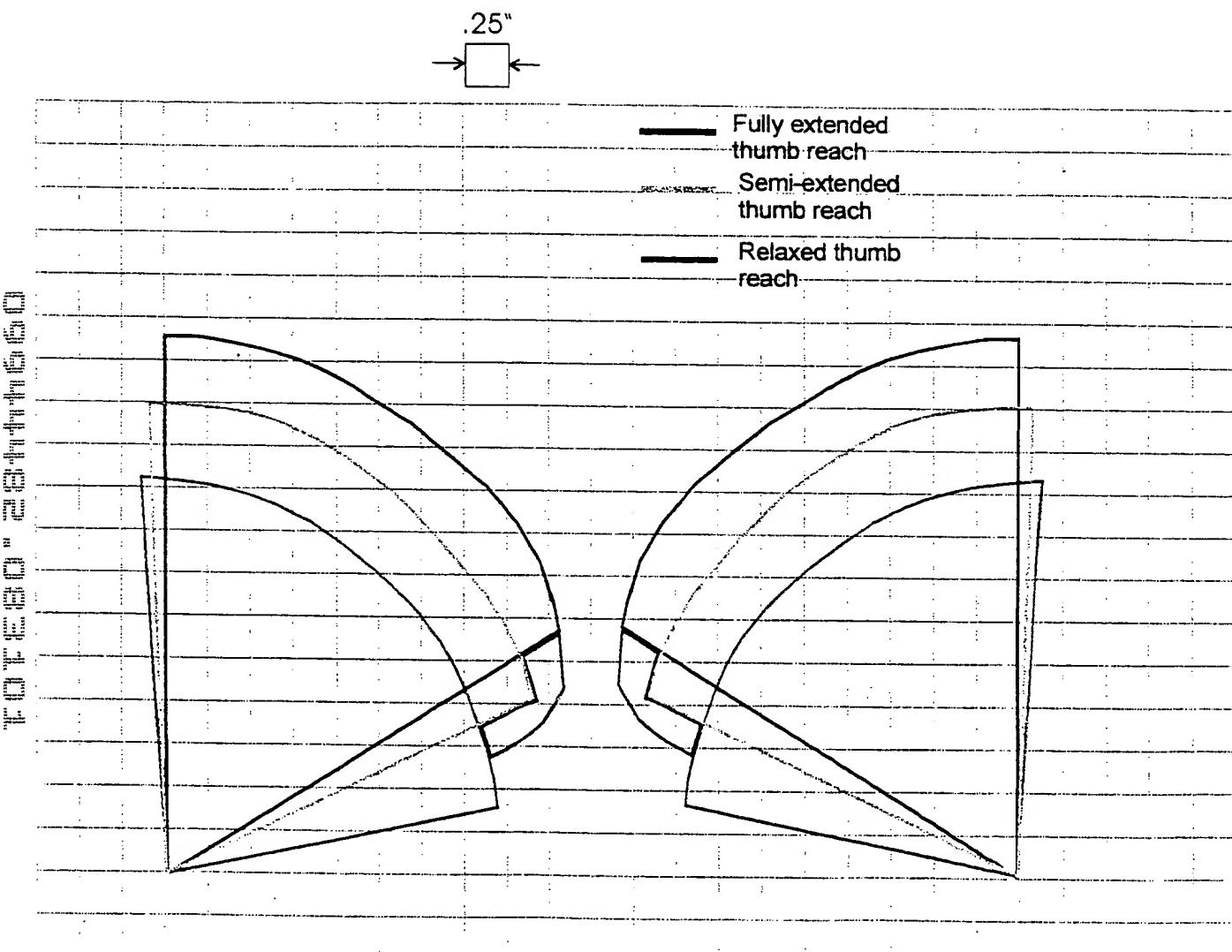
95%  
1st Percentile Combined Thumb Sweeps, Females Age 12-19  
(Uniform object thickness 0.75", corner radius 1.5")

Note: each data point represents thumb tip at centerline of thumb

\* Located vertically over point of thumb base contact with corner,  
at midpoint of lower corner radius on device

Fig 10 S

C 33



1st Percentile Combined Thumb Sweeps, Females Age 12-19  
(Uniform object thickness 0.75", **corner radius 1.5"**)

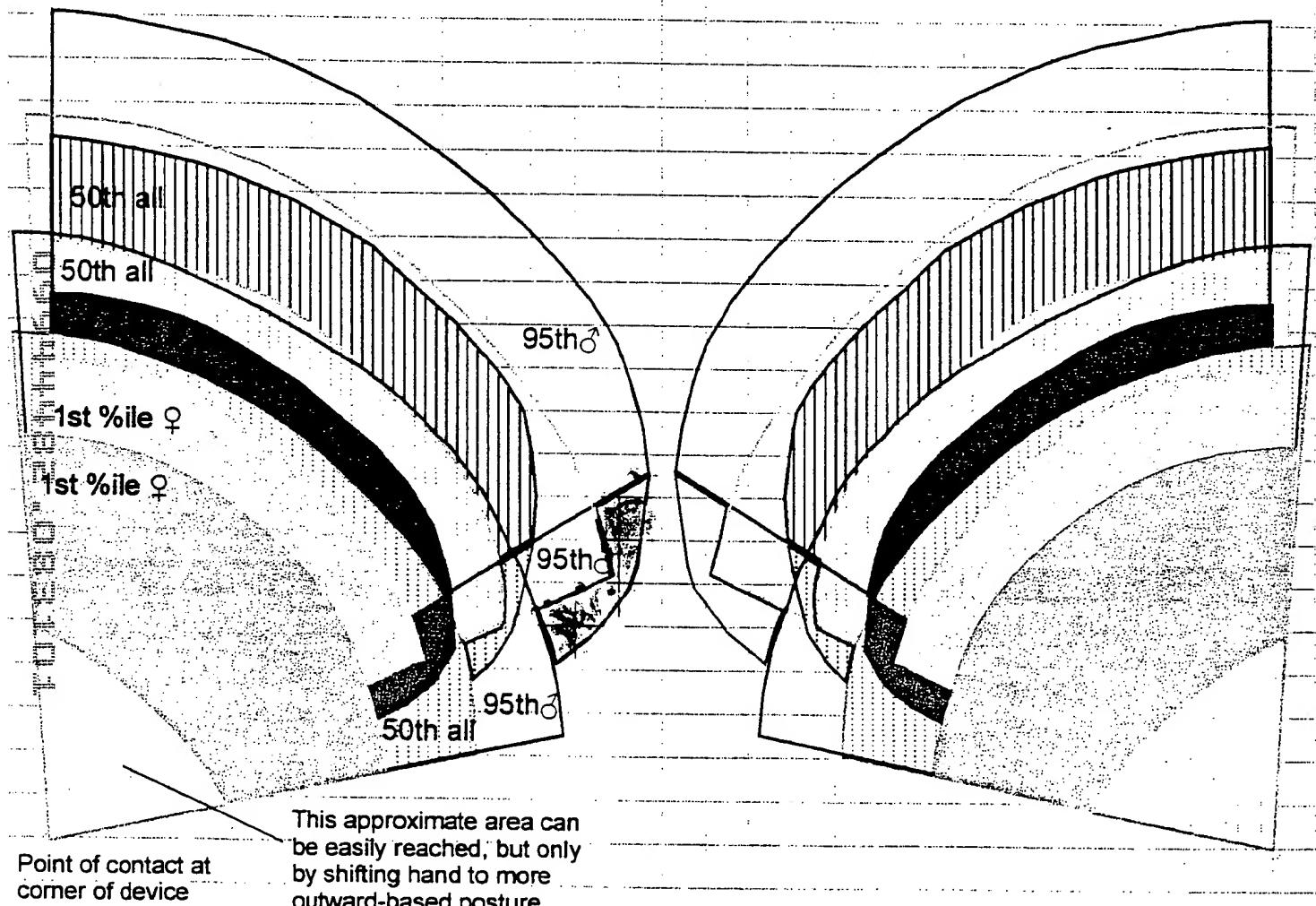
Notes: Each data point represents thumb tip at centerline of thumb  
Left and right thumb envelopes are arbitrarily placed relative to each other  
to permit cutting or measurements without overlapped reach lines

Fig. 107

C34

.25"

- Fully extended thumb reach
- Semi-extended thumb reach
- Relaxed thumb reach
- Area reached with some difficulty while fully extended



### Combined Thumb Sweeps, 1st Percentile Females Through 95th Percentile Males Age 12-19

(Uniform object thickness 0.75", corner radius 1.5")

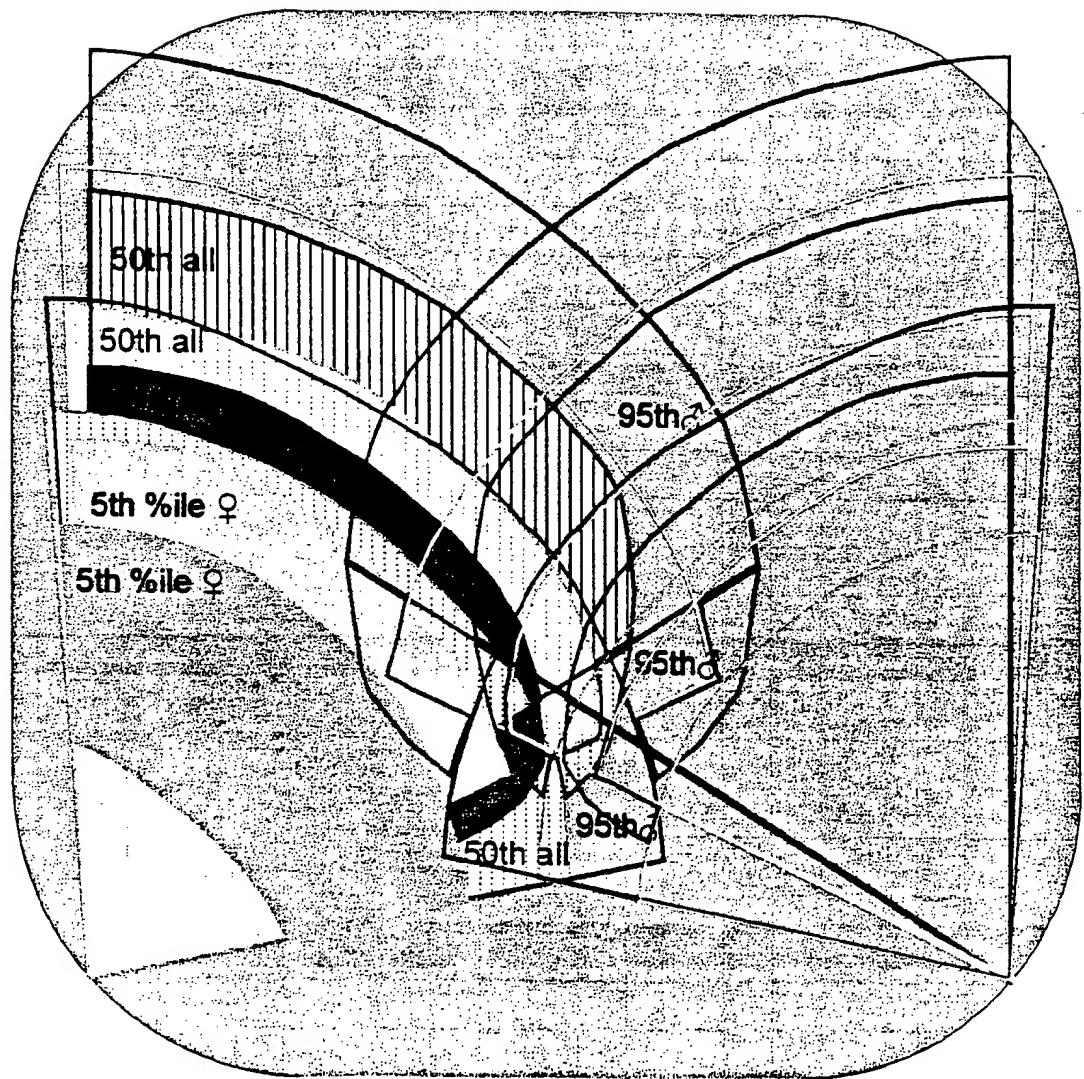
Notes: Each data point represents thumb tip at centerline of thumb

Left and right thumb envelopes are arbitrarily placed relative to each other to permit cutting or measurements without overlapped reach lines

Fig 10U

Located vertically over point of thumb base contact with corner, at midpoint of lower corner radius on device

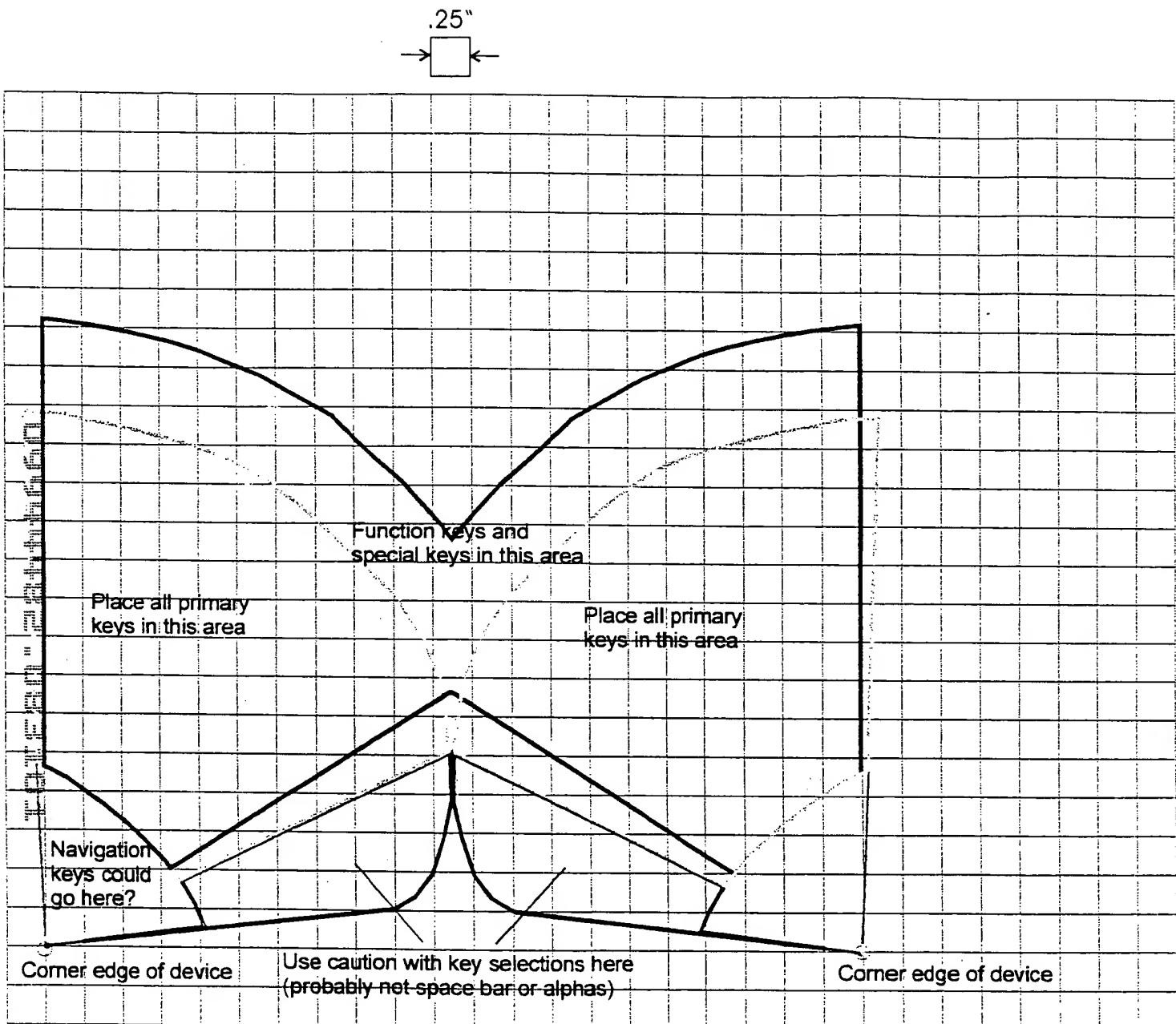
c35



## Thumb sweeps on 1.5 corner template, 5.5“ (50th percentile relaxed reaches overlap 0.15 in.)

Fig 10v

C36



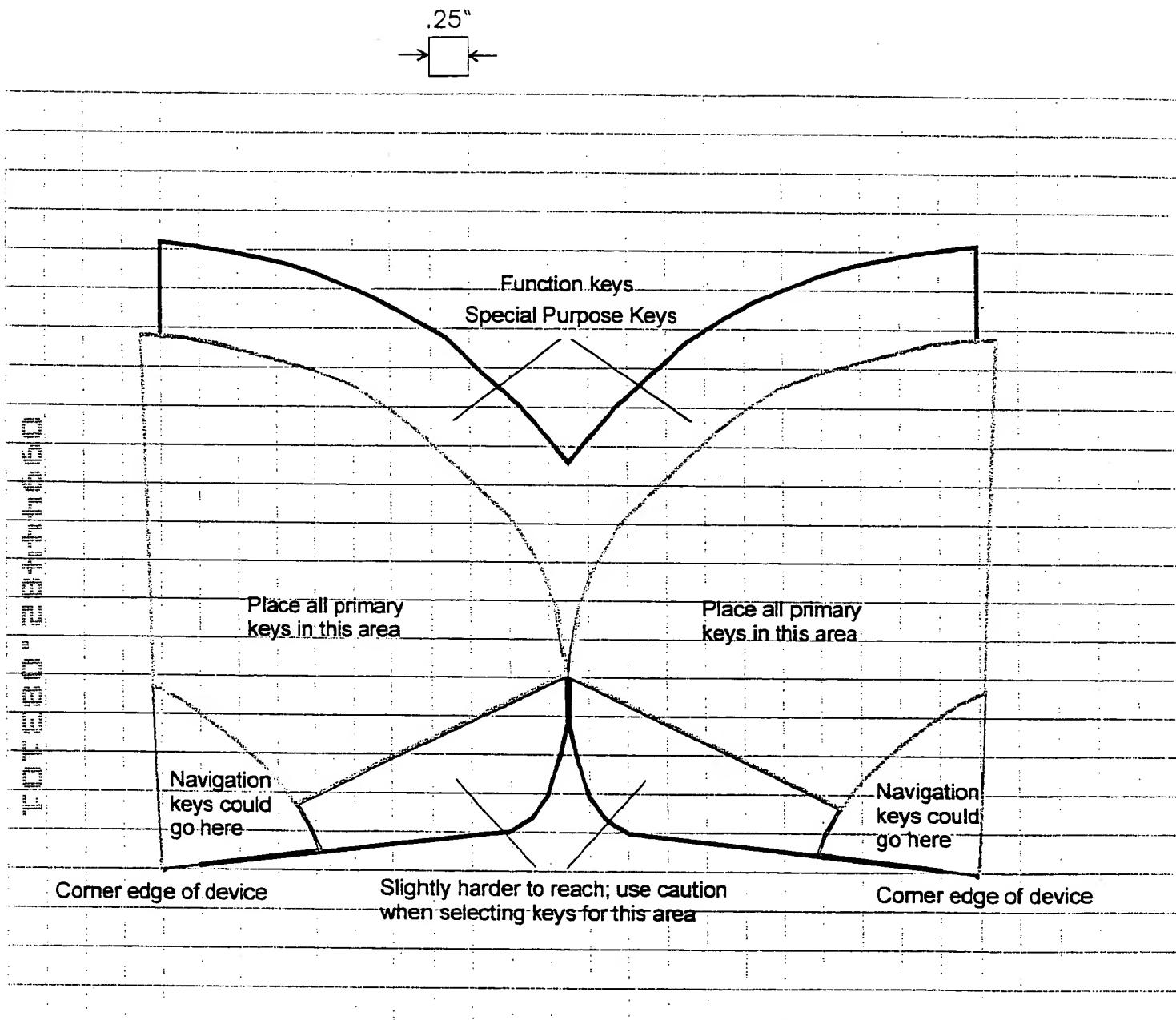
### Key Placement Guidelines

(Uniform object thickness 0.75", corner radius 1.5")

Using 50th percentile semi-extended reach for primary keying area

Fig 10W

c37



### Key Placement Guidelines

Device thickness 0.75" (uniform), corner radius 1.5" (plan view), corner radius approx. 1.0" (side view)

#### Notes:

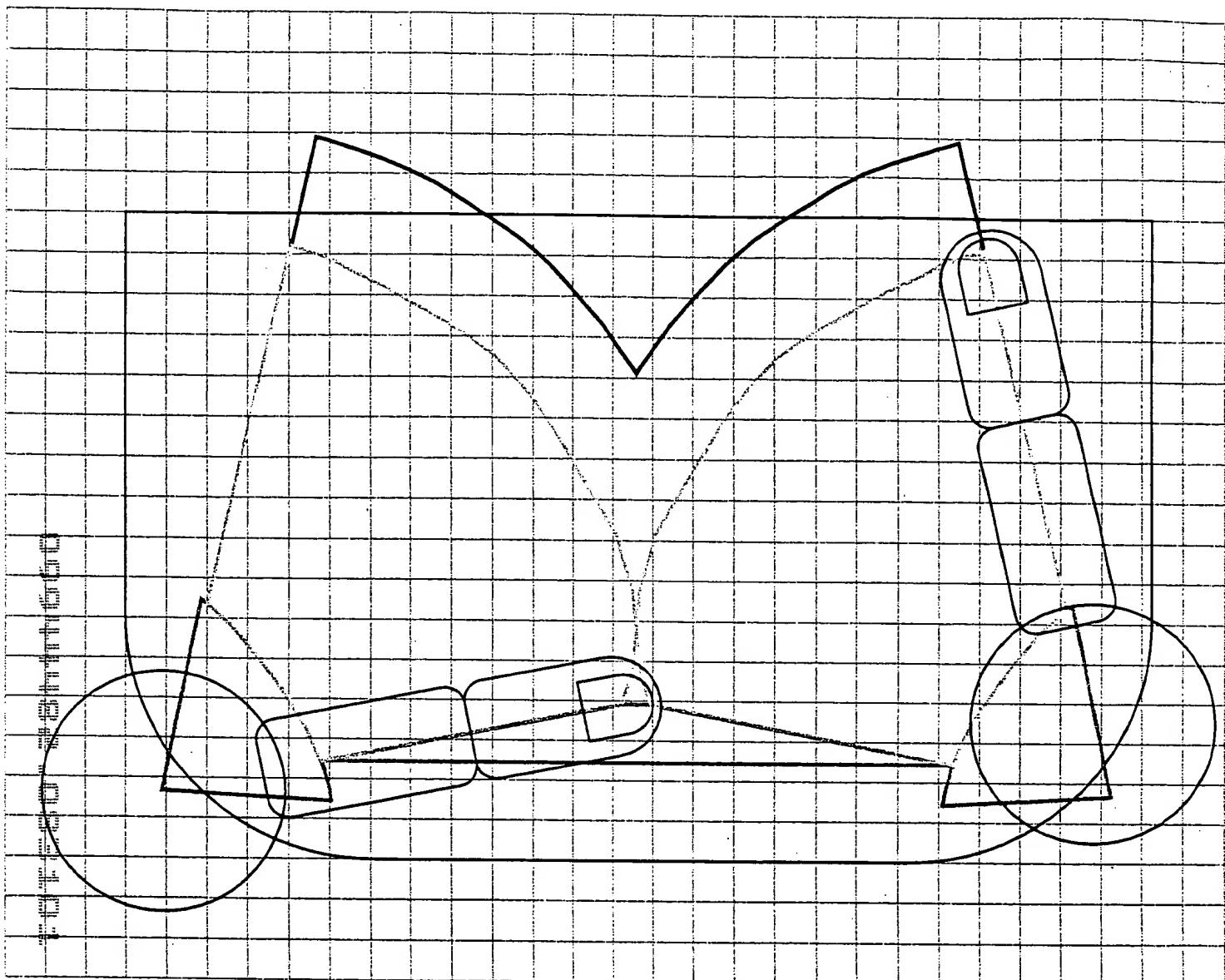
For device thickness of 0.75 in., keying area width is approx. 5.5 in.  
 Reach areas are valid for placement of thumbs at corner or along sides  
 Smaller corner radii decrease reach areas but permit easier reach into blue areas  
 Device thicknesses greater than 0.75 in. quickly decrease size of reach areas  
 Reach plots generally indicate a device width of approx. 6.0 in.

Fig 10X

C38

.25"

Exhibit from Brode



combined male and female

1. Used reach envelope of 50% woman with relaxed grip (not pitch or extended reach).
2. Drew geometry to represent the approx dims of 50% woman. Circle represents the palm at the base and crotch of the thumb.
3. Rotated the reach envelope approx 15° to more closely resemble the hand posture of holding a game controller.

Fig 10y

C 39

# Automated Wrapping Process

File → Tools → Automated Wrapping

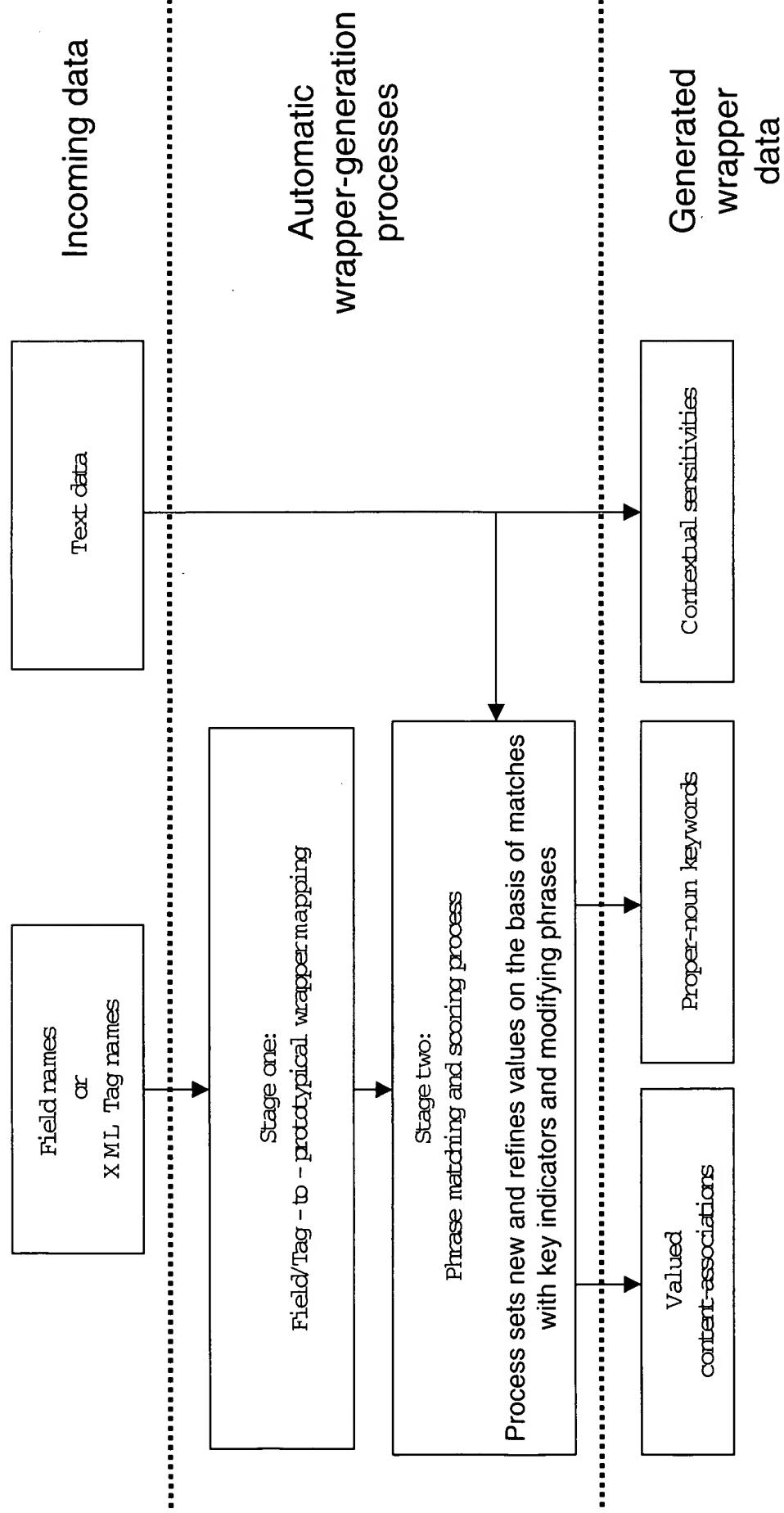


Figure 11

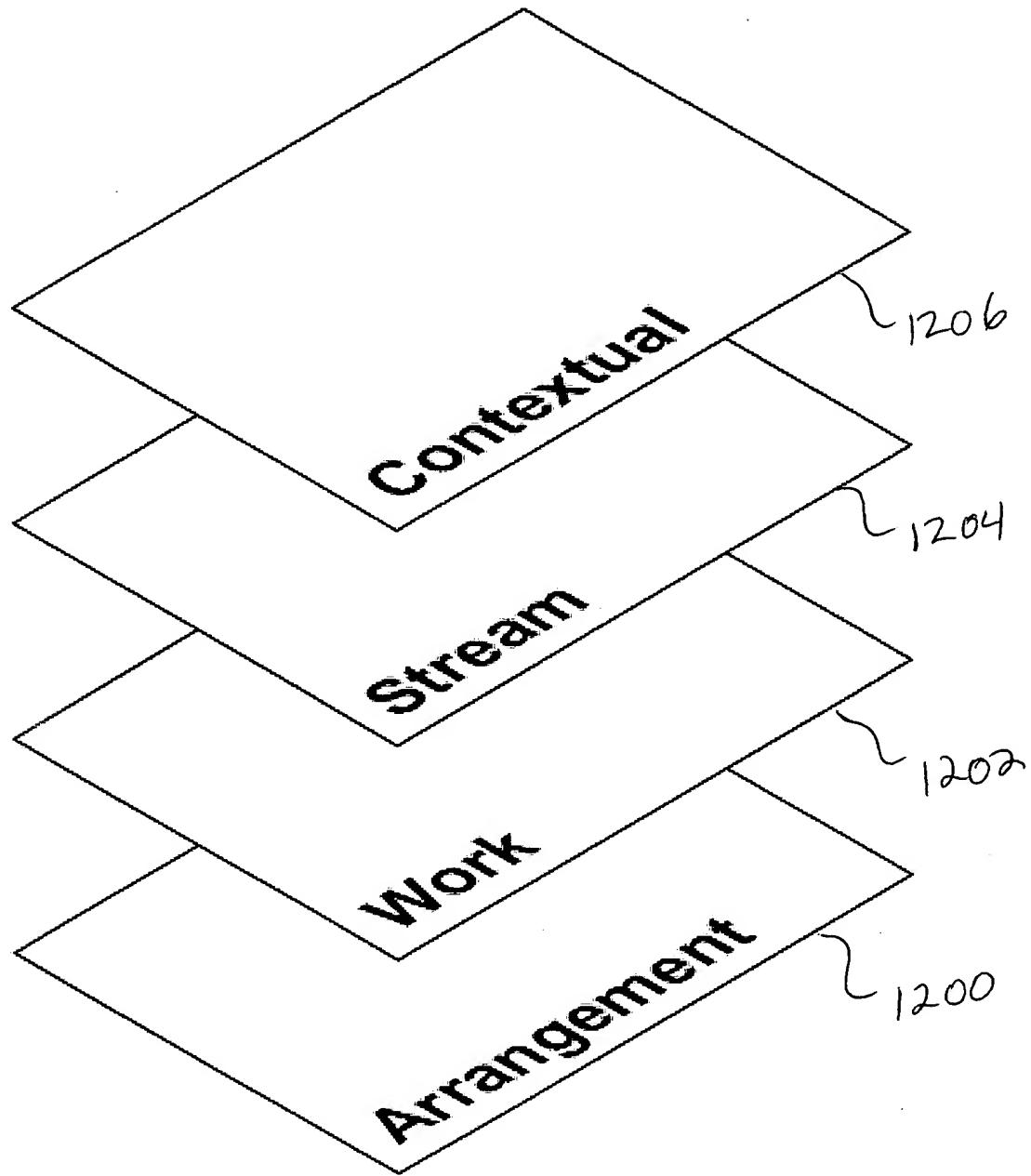


Fig. 12

100 110 120 130 140 150

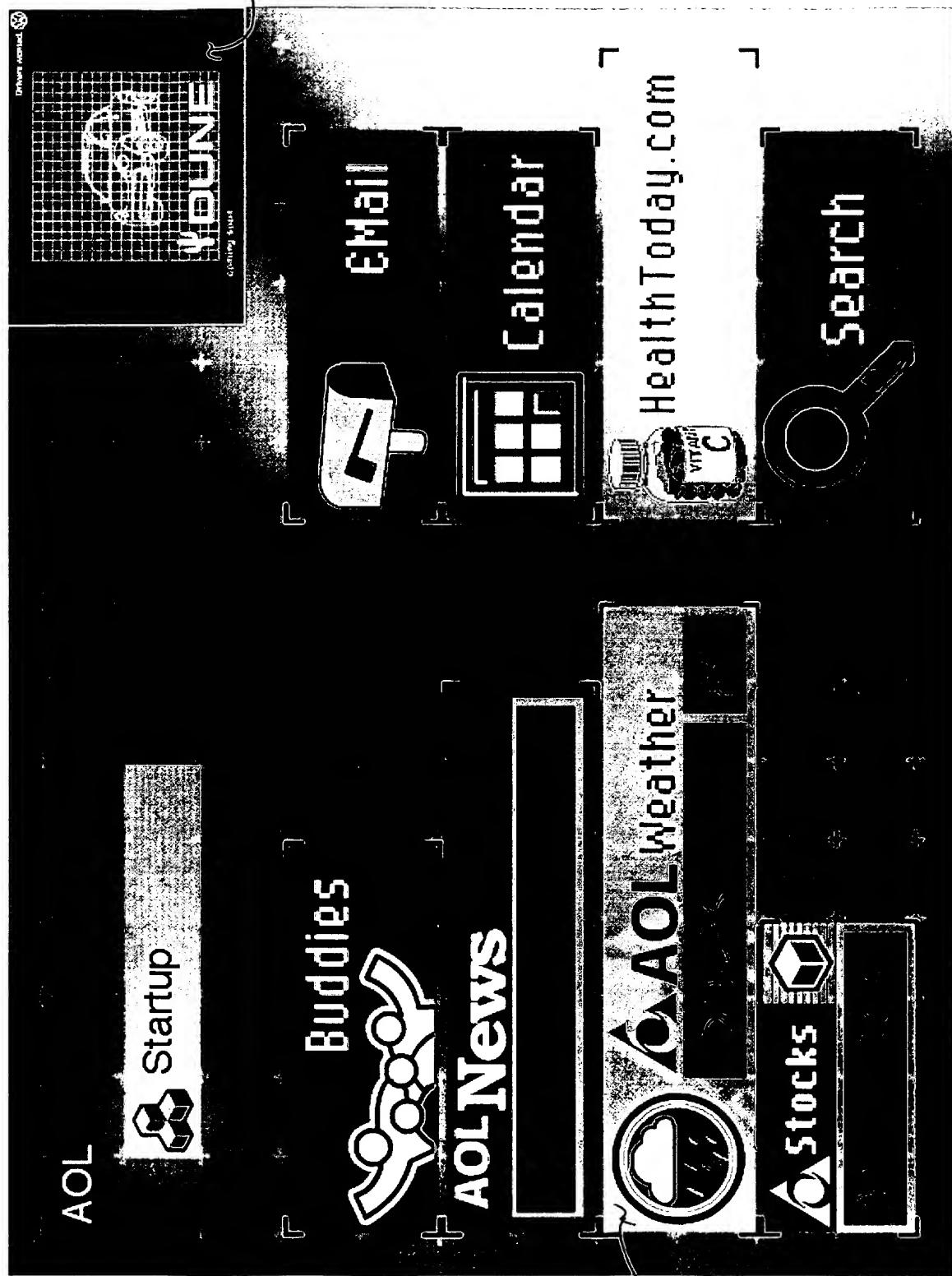


Fig. 13A

卷之三

Glaister

AOL Weather

## Results

Search

**City or Zip** **DALLAS, TX**

(example: 60601 or Chicago, IL)

## Type C Fährenheit

Celsus

△ Send

Close

The image shows a vintage AOL Weather search interface. At the top left is a hexagonal logo with a stylized 'AOL' inside. To its right is a search bar with the placeholder text 'City or Zip DALLAS, TX'. Below the search bar is a note in parentheses: '(example: 60601 or Chicago, IL)'. To the right of the search bar are two radio button options for temperature: 'Type  Fahrenheit' and 'Type  Celsius'. At the bottom right is a 'Send' button with a triangle icon. The background features a faint illustration of a sun, clouds, and a globe.

Startup

AOL Weather

Search

City or Zip

(example: 60601 or Chicago, IL)

Type  Fahrenheit

Celsius

Send

Close

Fig 13B

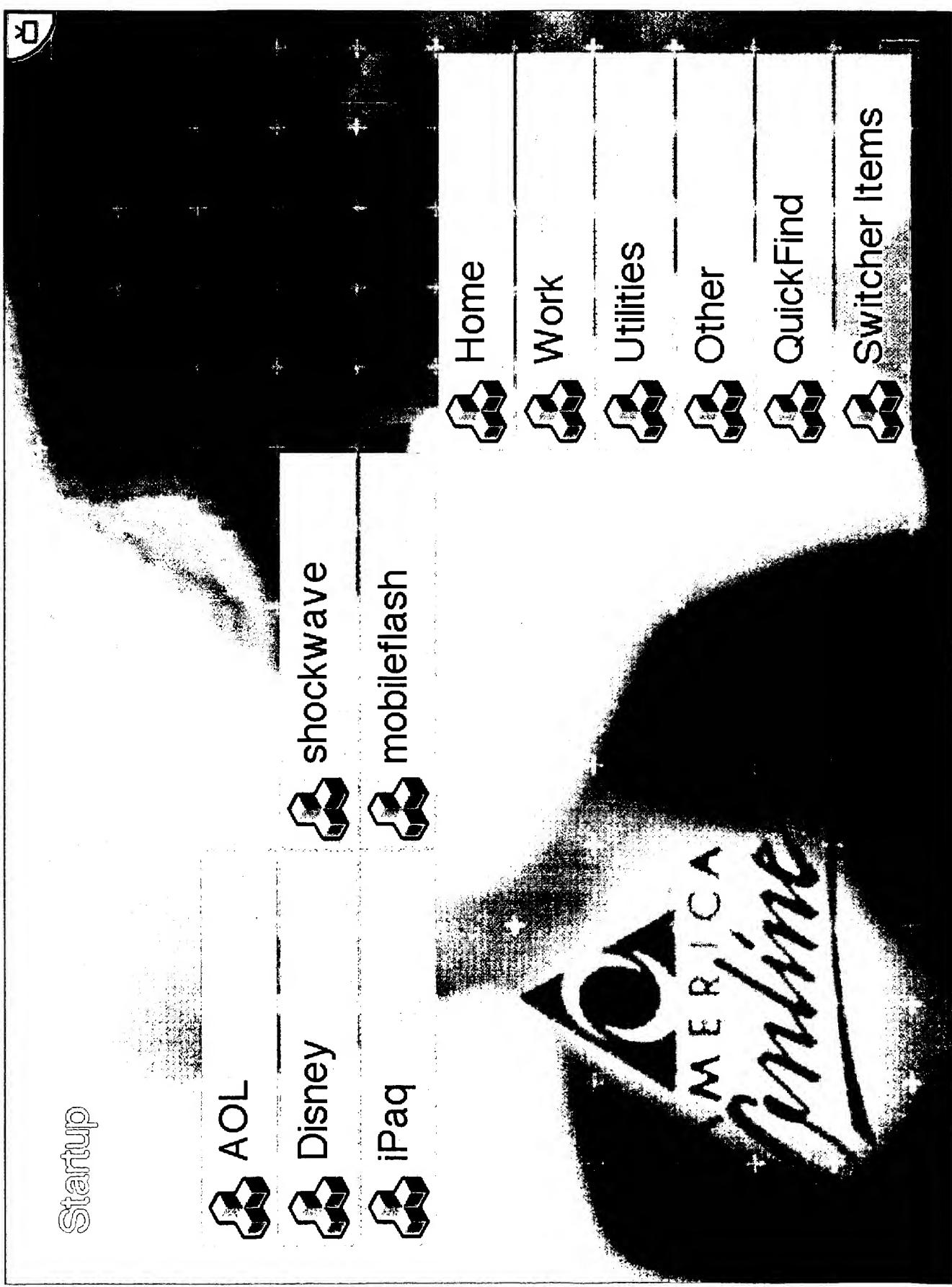
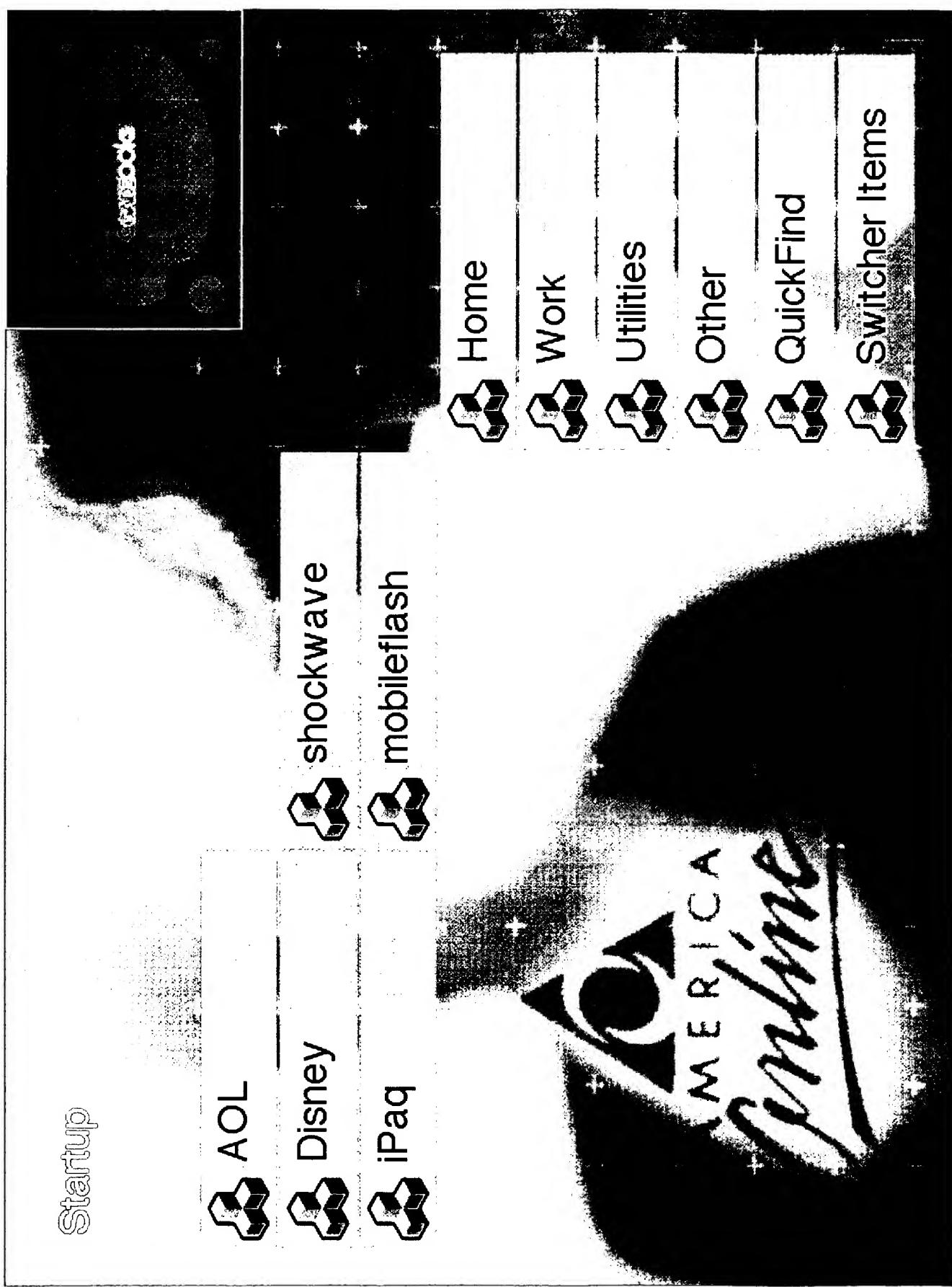


Fig. 14A

Fig 14B



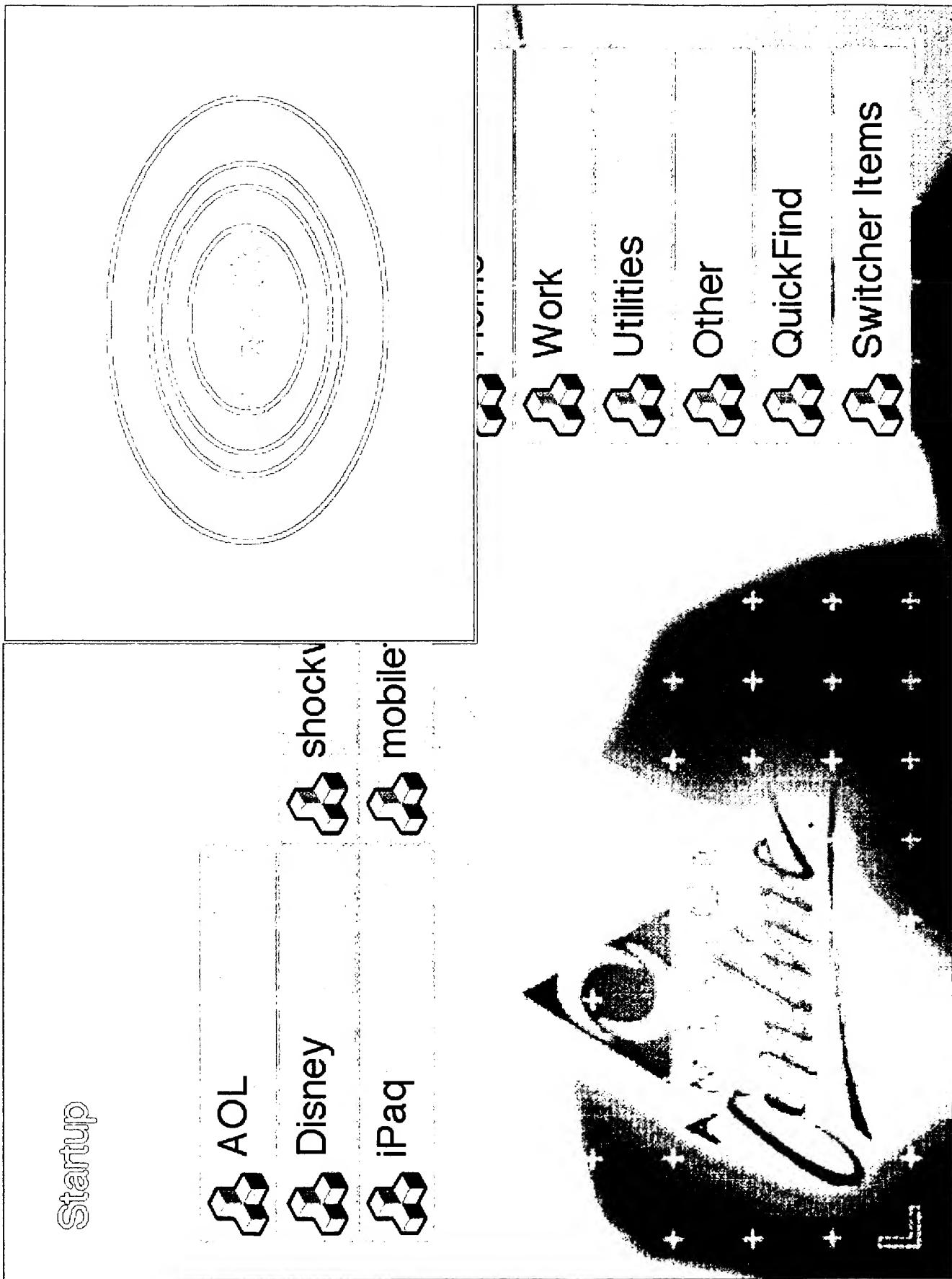


Fig 14c

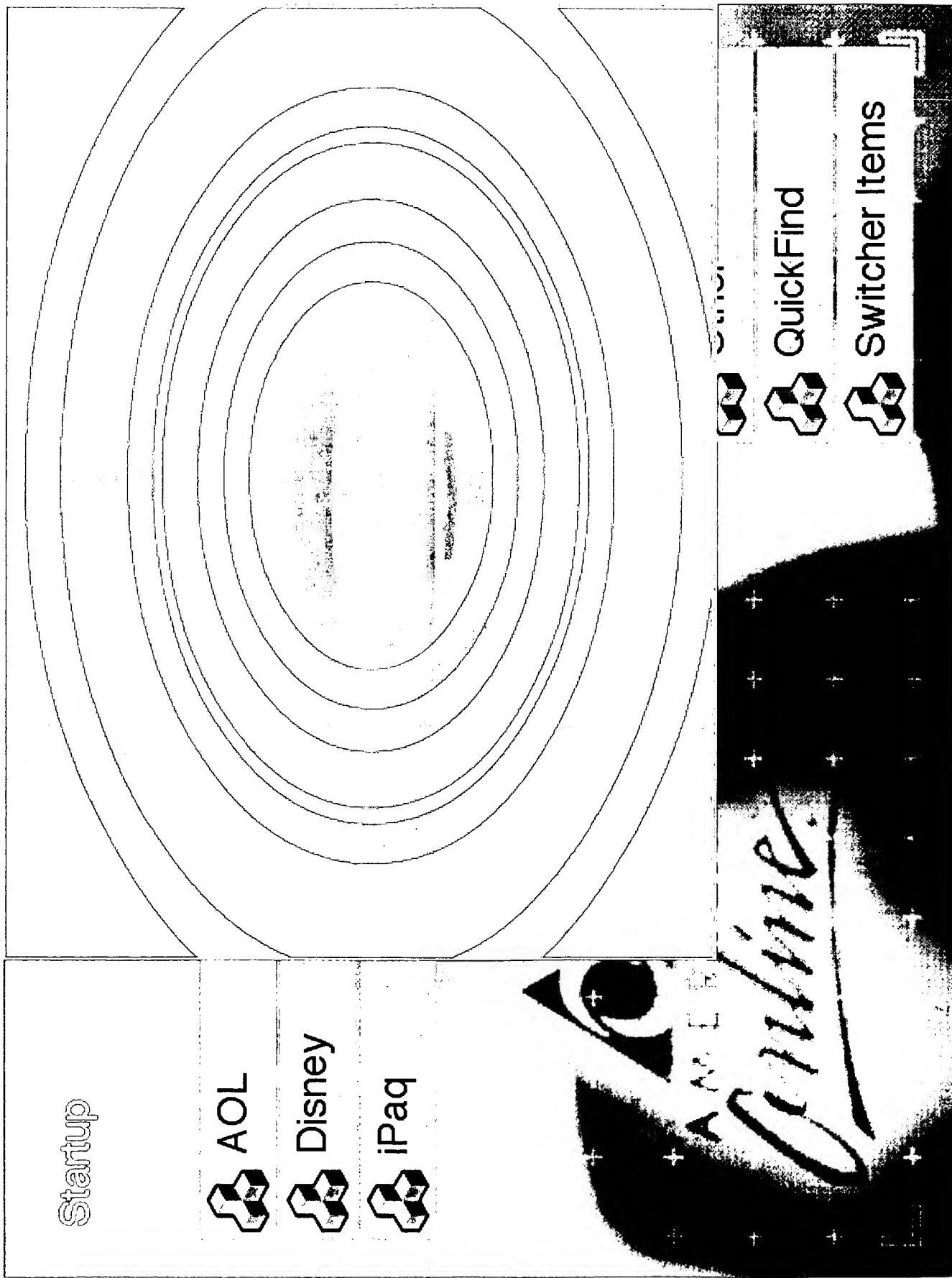


Fig 14D

0 9 8 7 6 5 4 3 2 1 0 1

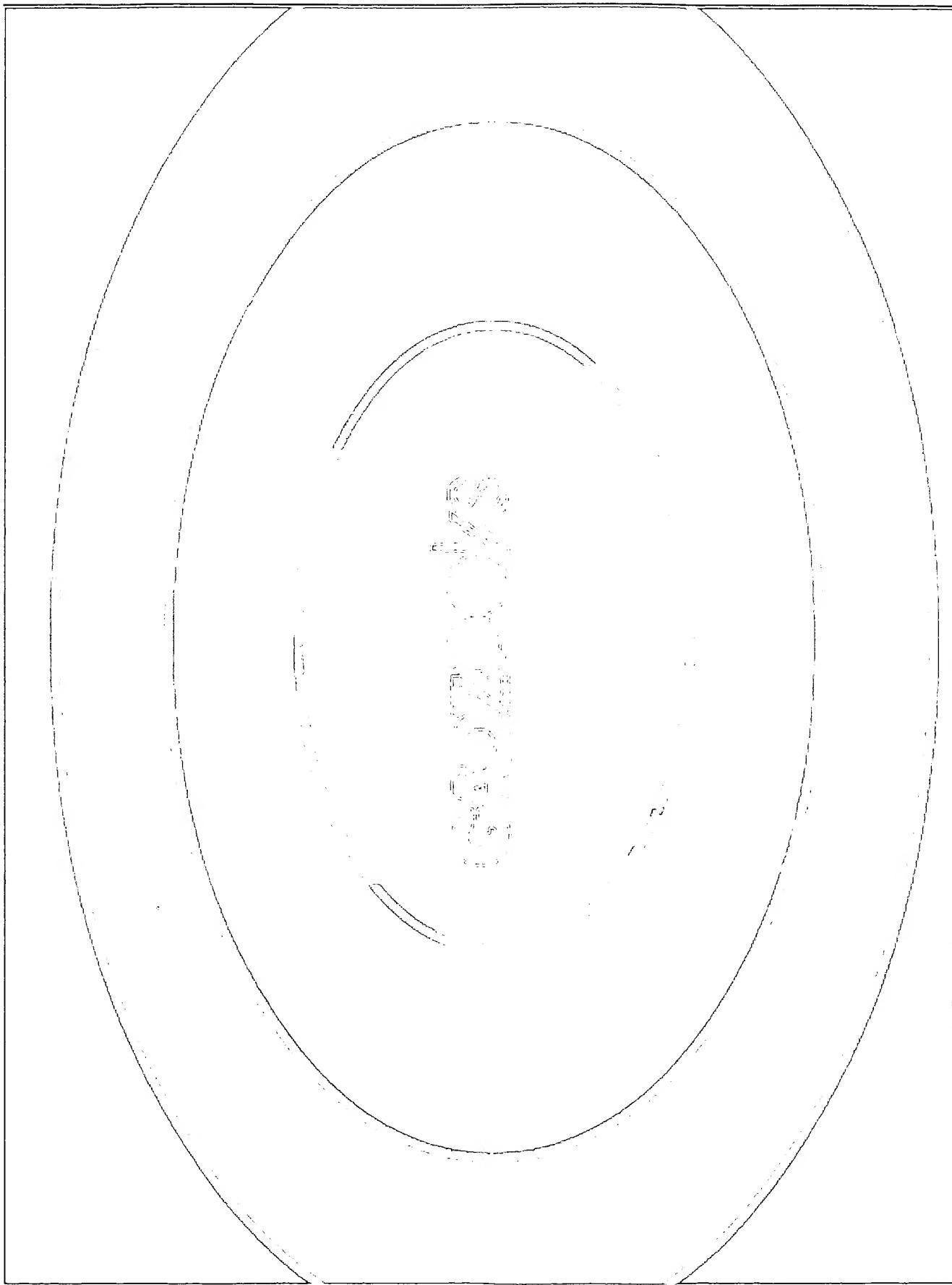


Fig 145

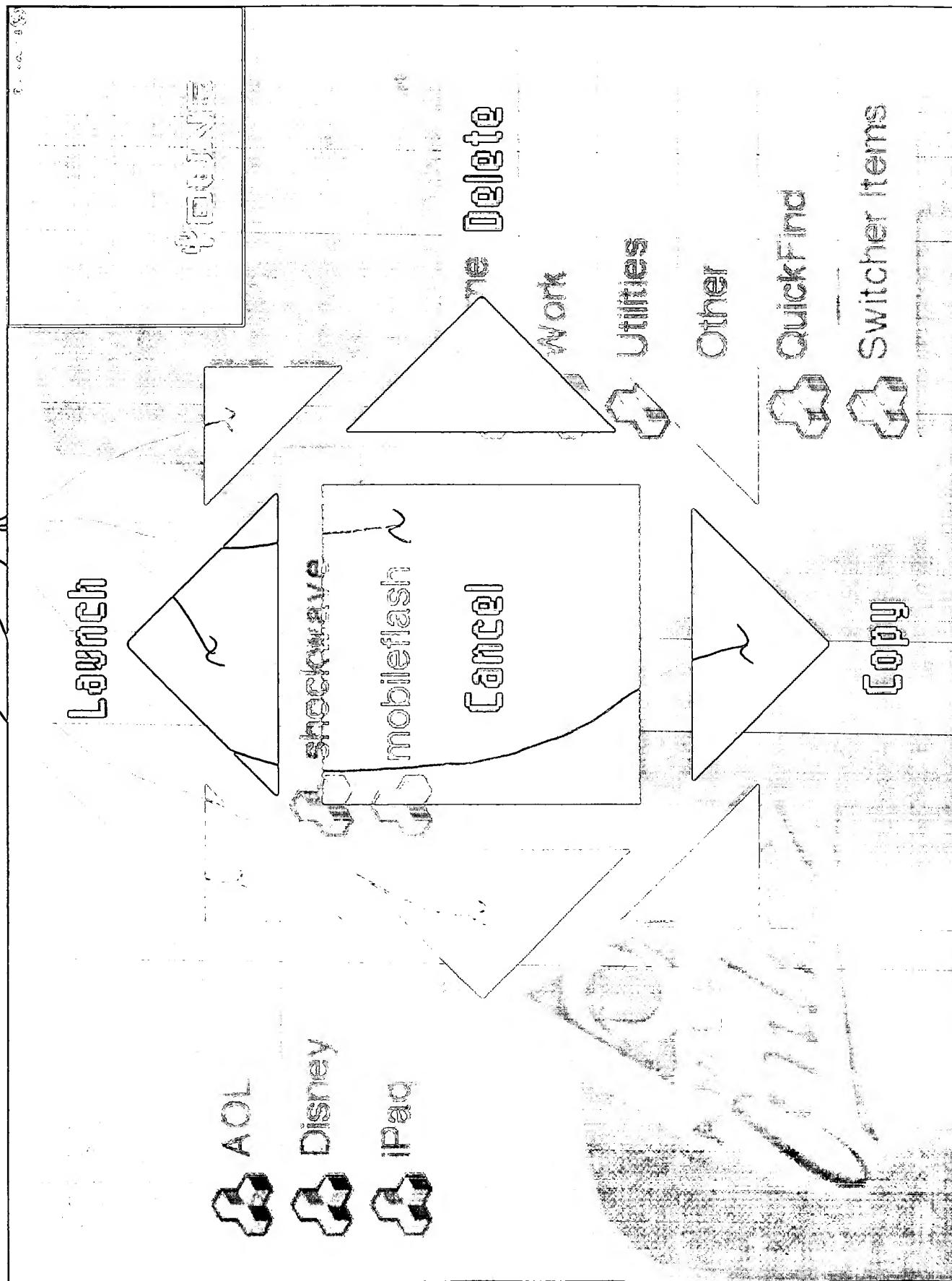


Fig. 15

1860 १८६० १८६० १८६०

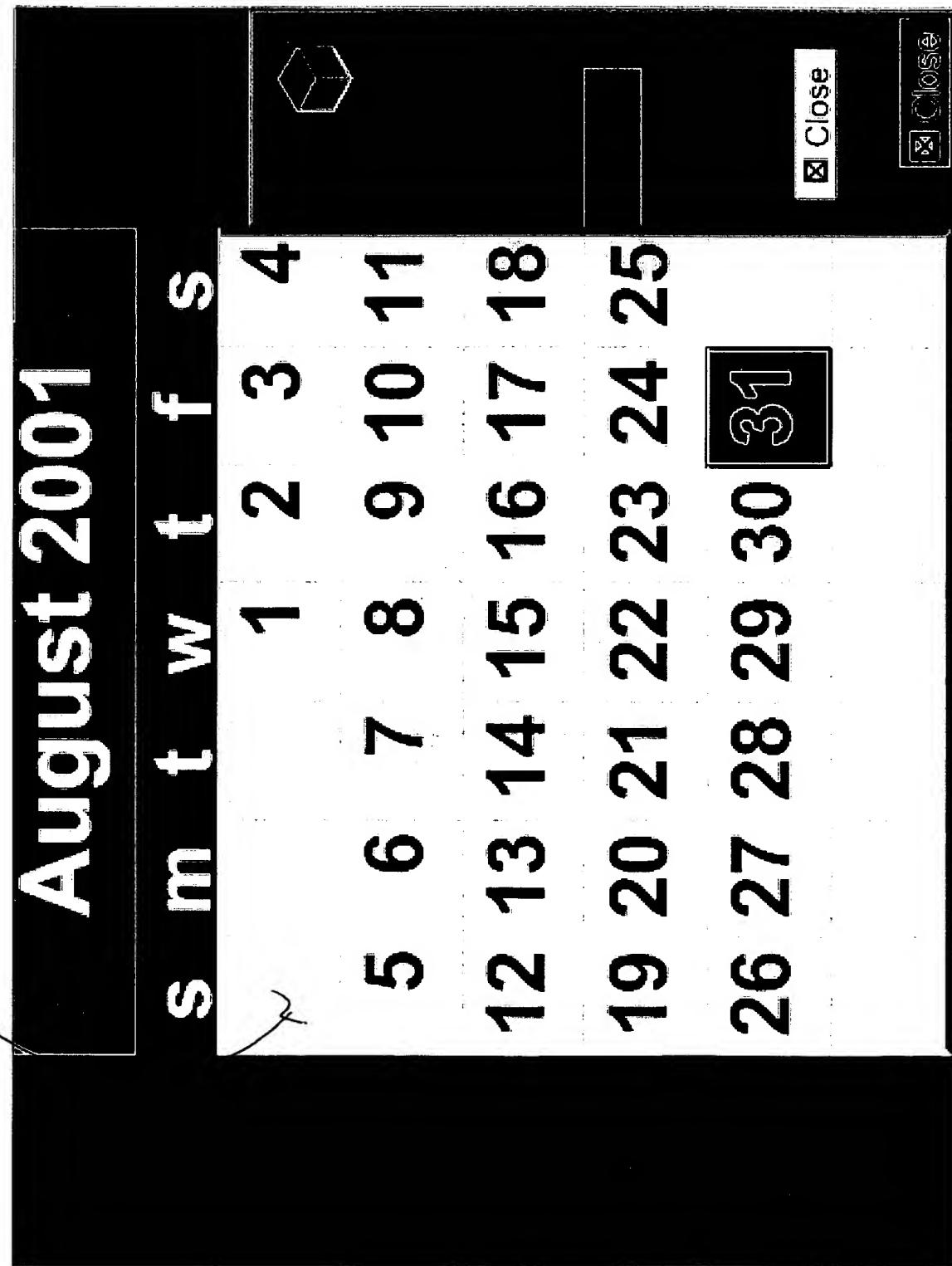


Fig 16

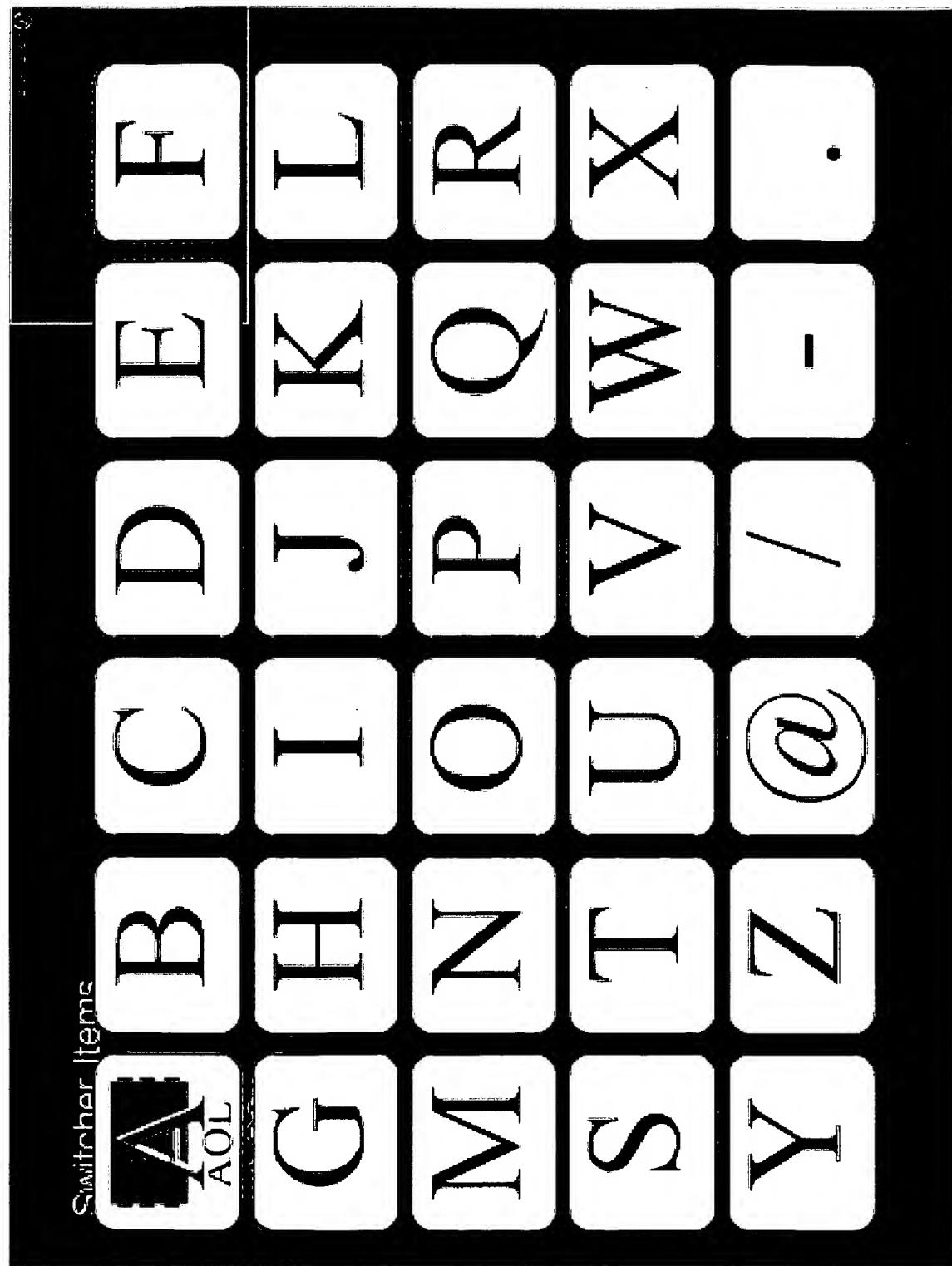
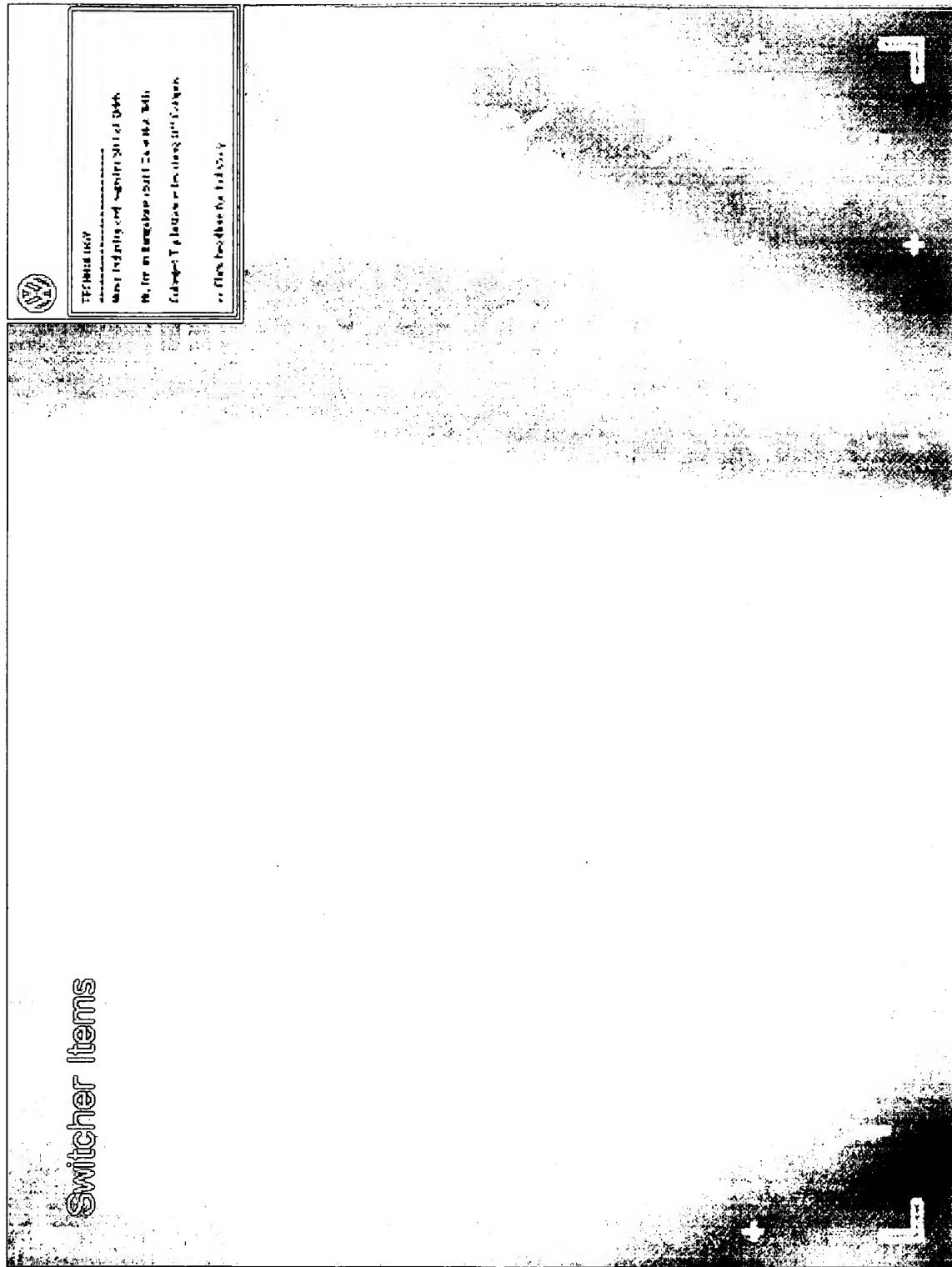


Fig. 17A

100-280-284411350



Switcher Items

Fig 17B

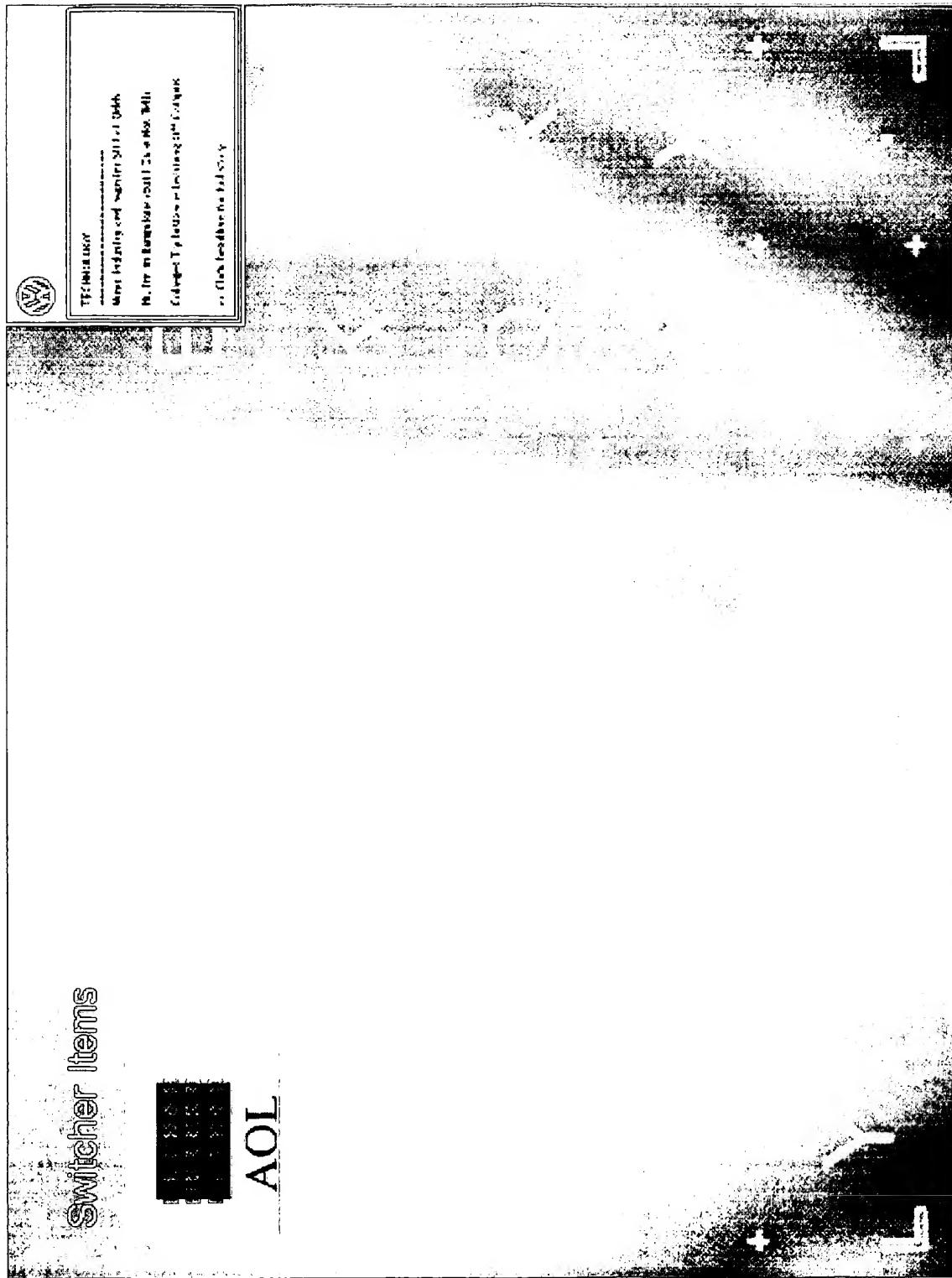
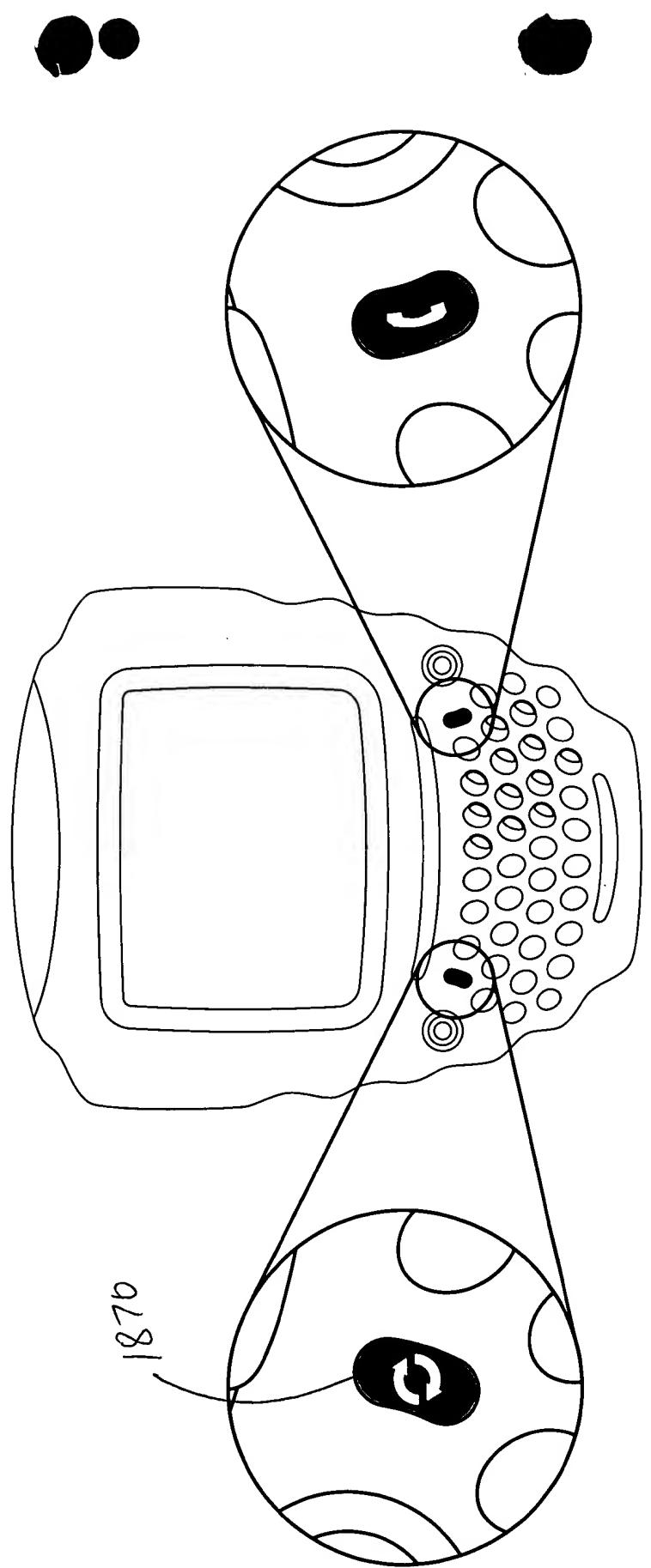


Fig 17c

10 11 12 13 14 15 16 17 18 19 20



100 280 28444650

Disney



Startup

1806

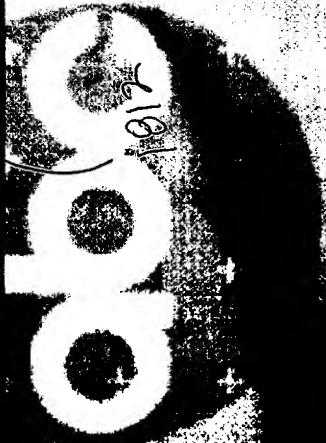


Search



abc Headlines

FBI: Minister Lied About  
Condit Sex Story



abc Stocks ~1008

IR 18.70 +1.30

Houston, Texas ~1010

1 0 0

Fig. 18A

## Utilities

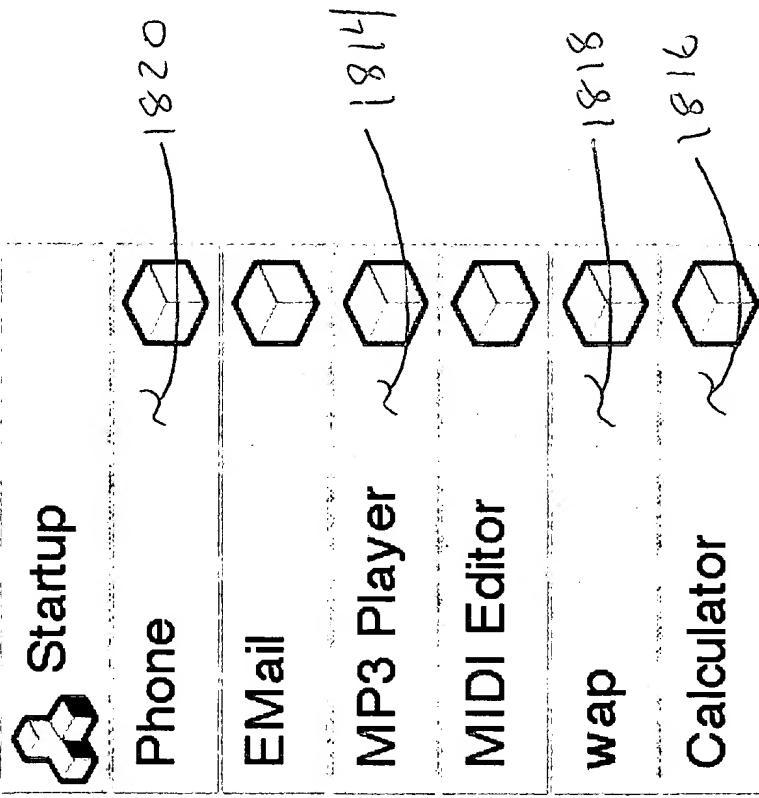


Fig 18B

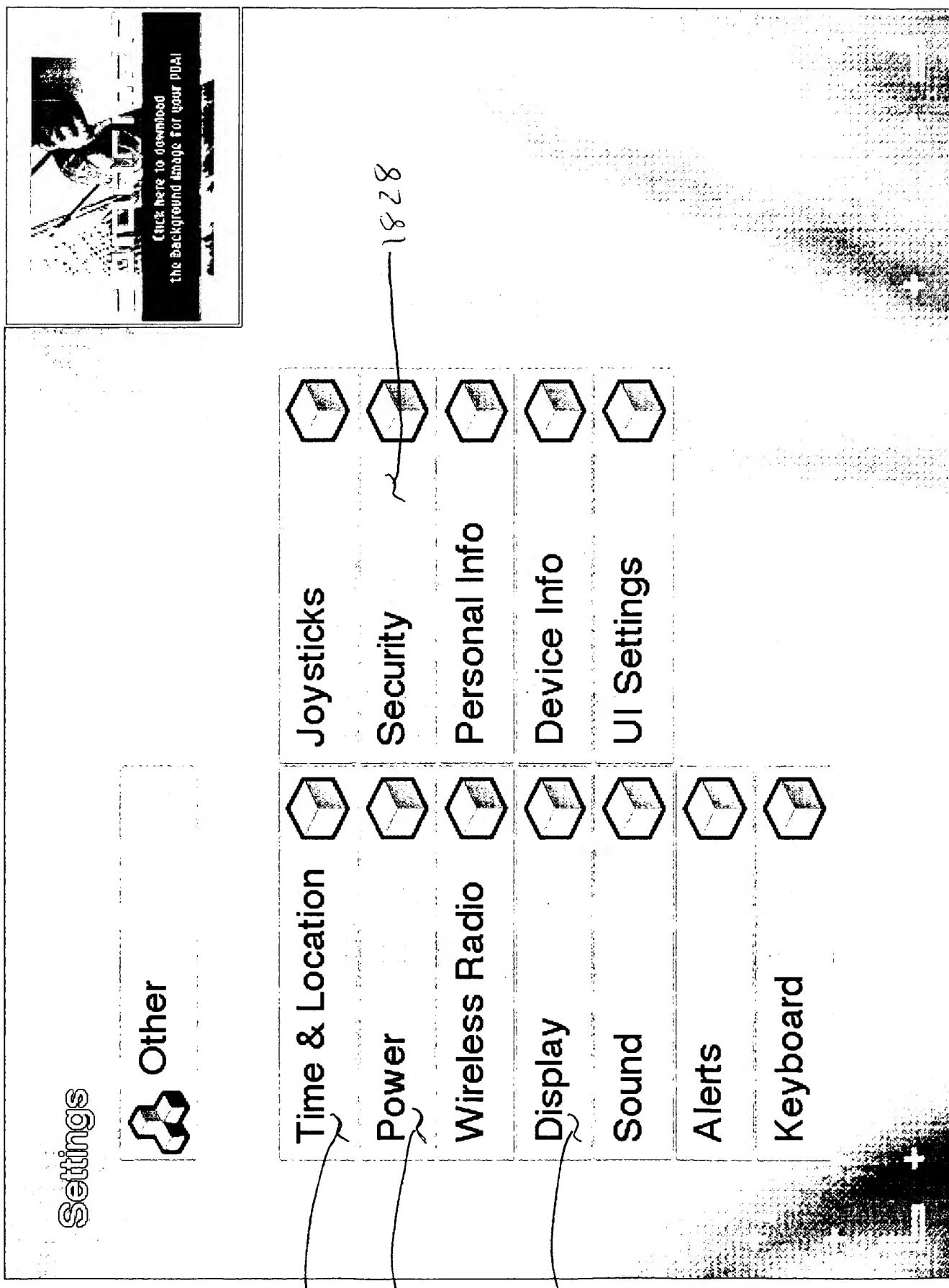


fig 18c

1802

Fig. 18 D (1800)

0 9 8 7 6 5 4 3 2 1 0

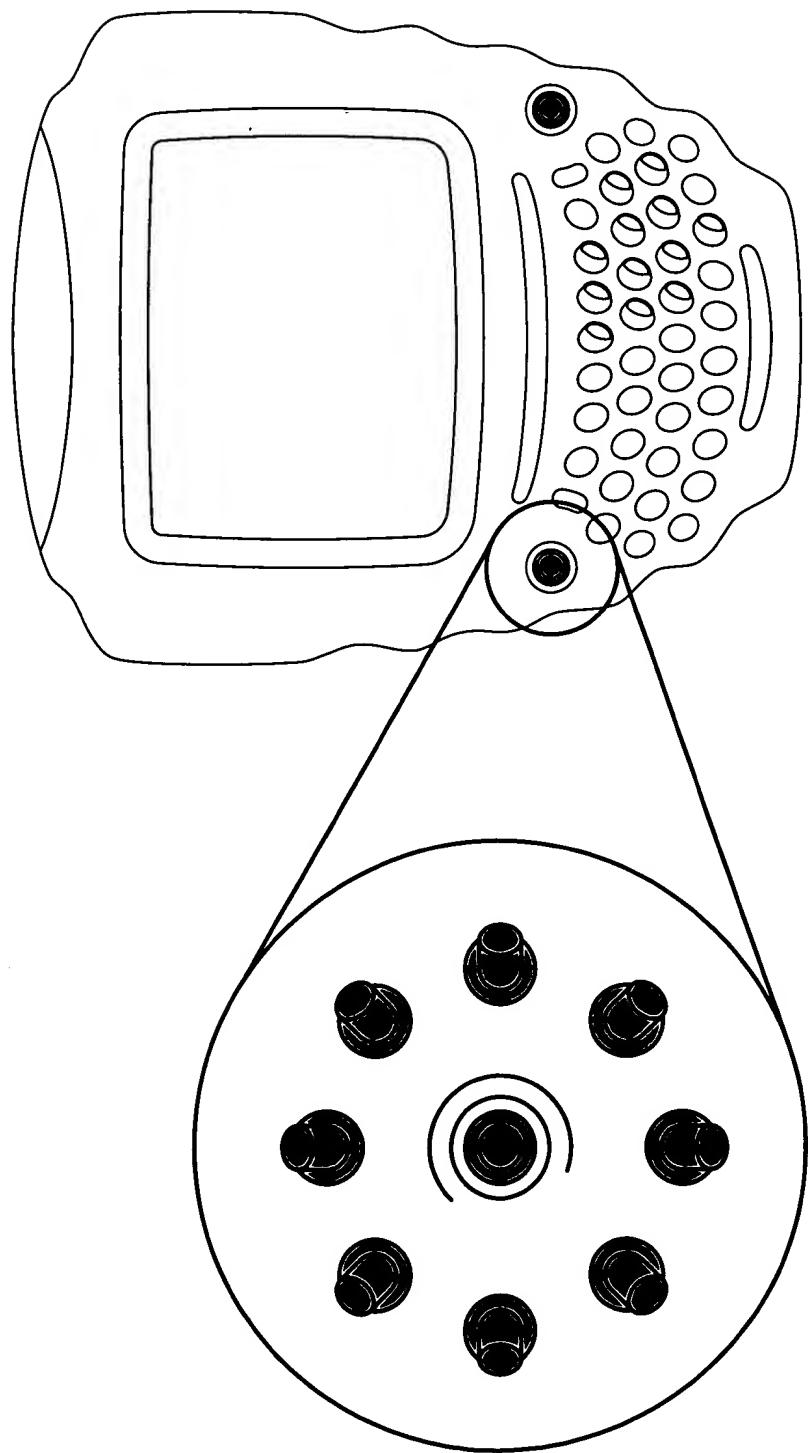


Fig 19